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Rhode Island. Dept of Health
Annual report

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FOURTH ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH,

OF THE

STATE OF RHODE ISLAND,

FOR THE

YEAR ENDING DECEMBER 31, 1881.

PROVIDENCE:
E. L. FREEMAN & CO., PRINTERS TO THE STATE.
1882.

MEMBERS

OF THE

RHODE ISLAND STATE BOARD OF HEALTH.

DECEMBER 31, 1881.

DAVID KING, M. D., *Chairman*	NEWPORT COUNTY.
DAVID SMITH	WASHINGTON COUNTY.
ALBERT G. SPRAGUE, M. D.	KENT COUNTY.
GEORGE W. JENCKES, M. D	PROVIDENCE COUNTY.
THOMAS H. SHIPMAN, M. D	BRISTOL COUNTY.
CHARLES H. FISHER, M. D., *ex-officio, and Secretary*	PROVIDENCE COUNTY.

u + 6

To the Honorable General Assembly of the State of Rhode Island.

Herewith is respectfully presented the Fourth Annual Report of the State Board of Health, in compliance with sec. 9, chapter 83, of the Public Statutes.

The Report is for the year ending December 31st, 1881, and presents a part of the general proceedings of the Board and of the work performed under its supervision; and is wholly included in the report of the Secretary, which will be found in the following pages and is respectfully submitted.

CHAS. H. FISHER, Sec.

HENRY E. TURNER, Chairman.

May 3d, 1882.

NOV 27 1894
Dr. J. Wengele Esq.
91946

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REPORT OF THE SECRETARY.

To the Honorable the General Assembly and the members of the State Board of Health:

The Secretary of the Board herewith respectfully submits his Fourth Annual Report.

The Report is designed to present an account of the general proceedings of the Board, and the work of the Secretary for the year ending December 31, 1881.

In regard to the general condition of the public health, during the year, it may be said that there was no great departure from the circumstances that usually prevail. In localities of somewhat limited extent, special forms of disease occurred and prevailed more or less largely, and to a greater or less degree of fatality, varying with the form of disease and place of occurrence.

The most remarkable of the special forms of disease, whether usual or unusual, that occurred during the year, were those presenting the distinctive characteristics of Malarial Fever. The prevalence was unprecedented in the history of the State. Following the sudden advent and almost universal prevalence over a small territory in Barrington in 1880, it reappeared in the same town in 1881 with but little lessened virulence and with larger distribution; and in South Providence, where it had prevailed to a small, but gradually increasing extent for two or three years previous, it reappeared in 1881 with greatly increased and alarming prevalence. In several sections of the State it was also quite prominent during the year 1881, as one of the most prevalent forms of disease, and not less than eighteen towns reported its presence to a greater or less extent.

On another page will be found a paper by Dr. C. V. Chapin, giving a more extended account of the appearance and prevalence of the Malaria in Rhode Island, and in the tables summarizing the Monthly Reports, will be found the comparative prevalence in the different towns.

Diphtheria, which had largely diminished in the number and fatality of cases in Providence city during 1879 and 1880, was more prevalent in that city during 1881, but not to the extent of an epidemic, nor was there any report of epidemic prevalence in any town in the State except in the town of Hopkinton.

Scarlet Fever also, although appearing in varying proportional numbers in nearly all the towns in the State, did not attain to epidemic prevalence, except in limited areas and for short periods of time.

Most of the less fatal forms of contagious and infectious diseases, appeared in many of the different towns during some part of the year, and in some localities prevailed as epidemics. Reference to the tables of monthly reports, and annual reports of medical correspondents, may be had for a more particular account of the places and times of prevalence of the various diseases.

MEETINGS OF THE BOARD.

The usual quarterly meetings with adjournments, and one special meeting were held during the year. At these meetings various sanitary questions appertaining to the preservation of health and the prevention of disease, were topics of discussion, and many items of knowledge and fact, ascertained by the observation and experience of the members were contributed.

At a meeting of the Board held April 7th, 1881, the sanitary condition of Newport was one of the subjects of discussion occasioned more particularly by a communication from the Secretary of the Sanitary Protection Association of that city addressed to the Chairman of the State Board of Health.

It was therein charged that the legal Board of Health of Newport (the Mayor and Board of Aldermen,) did not take sufficient notice of the presence of certain contagious diseases in that city, in that measures for the restriction and prevention of the same were neglected, and also that well known nuisances were allowed to remain unabated.

His Honor S. P. Slocum, Mayor of Newport, appeared in rebuttal of the charges.

From the statements of the Mayor, and the written testimony of a number of the leading physicians of Newport, it did not appear to the Board that the charges in regard to the large prevalence of diphtheria and scarlet fever were sustained, but it was virtually admitted that *legal measures* for the restriction of the same had been quite limited.

It was also admitted that there were some unsanitary conditions in localities mentioned, such as could be found in every city, and assurance was given that such unsanitary localities and conditions would have attention, and be remedied as soon as proper municipal legislation could be secured.

At the same meeting the following communication from Dr. O. C. Wiggin, a former member of the Board, was presented:

PROVIDENCE, Jan, 26th, 1881.

To the Members of the State Board of Health:

GENTLEMEN:—I have this day resigned my position as a member of your Board. I have felt impelled to this action on the ground that neither my time nor my health are adequate, in justice to the demands of this important office. My connection with the Board as a corporate body and with each of its individual members has always been a pleasant one, and the subjects which you are expected to investigate have ever been of the most lively interest to me, but the little time I have had to devote to them has made the office one of constant regret to me. I take my leave of you, gentlemen, with feelings of the utmost respect.

Very truly yours,

OLIVER C. WIGGIN.

The resignation was received and placed on file, and, upon motion of the Secretary, the following resolution was passed unanimously:

Resolved, That the State Board of Health receive with sincere regret the notice of the resignation of Dr. O. C. Wiggin of membership on this Board; and the members of the Board, as an associate body and individually, hereby testify to his manifest interest in all sanitary work, and his uniform urbanity and courtesy on all occasions to each and all of them.

The topic of pollution of rivers, introduced by the secretary, was also considered at considerable length at this meeting.

At the quarterly and also the annual meeting, held July 6th, after the usual routine business, and report of the Secretary in relation to reports of nuisances, visits to towns, investigation of sales of immature veal, and contagious and other diseases among domestic animals, the following were continued the officers of the Board for the ensuing year, viz:

Chairman,	DAVID KING, M. D.	Newport.
Secretary,	CHAS. H. FISHER, M. D.	North Scituate.
Auditor,	DAVID KING, M. D	Newport.

At this meeting the Secretary reported in full an account of a meeting of the Council of the Newport Sanitary Protection Association in May, which he attended upon invitation on his private responsibility in part; and also an account of various unsanitary localities and premises pointed out to him by a committee of the council of that association, and of his conference and correspondence with parties in authority in Newport city, in relation to the same.

This report was considered at considerable length, and Dr. David King introduced the following resolution which was passed unanimously:

"*Resolved*, That the State Board of Health recommend to the Honorable Mayor and Board of Aldermen of the city of Newport, the appointment of a Special Commission of Health, consisting of the Mayor and two others, one of whom shall be a competent physician, and the other a competent engineer.

"Of this Health Commission appointed by the Board of Aldermen, the Mayor shall be the Chairman."

At the same meeting there were presented copies of the new blanks devised and distributed to all the town and city clerks and city registrars, required in compliance with the amended and additional laws in relation to marriage, (sample copies of which may be found on pages 157–160,) the circular to clergymen and town clerks in relation to the same, (see page 160,) and the following circular in relation to compliance with the Public Statutes, of protection from small-pox by public vaccination.

(CIRCULAR J.)

OFFICE OF THE STATE BOARD OF HEALTH,

PROVIDENCE, April 13, 1881.

To the Town Councils or Local Boards of Health:

The State of Rhode Island is now, and happily has been for many years, exempt from any widely spread prevalence of SMALL POX.

Until within a few years, there was a period of time of considerable length, during which free vaccination was frequently provided by the authorities of the different towns, for all persons who would avail themselves of the protection against small pox thus gratuitously offered; and the freedom from this dire scourge of humanity in this State during a long period in the recent past, has been due to the protection thus provided.

There come now to the Secretary of the Board, complaints from many of the towns, that the law, (as provided in Chapter 74 of the General Statutes, and in Sections 24, 25 and 26 of the said chapter,) is not, and has not been for several years complied with by the proper authorities of the towns.

In one town no free vaccination has been provided in nine years. In this way the State will soon afford a free and inviting field for the introduction and dissemination of small pox with all its destructive results.

The disease is now prevalent in several of the larger cities, and quite largely in two, with which the towns of Rhode Island are in constant intercourse and communication by persons and merchandise.

The need of attention therefore to the matter of public protection from an invasion of small pox, will not fail to be perceived by the authorities of the different towns.

It should be remembered that one vaccination, (even if properly performed, and the vaccine disease runs through all the natural stages, to the production of the pitted scar,) does not always furnish complete protection, and therefore *re-vaccination* should always be performed until no characteristic vaccine pustule is produced.

The plan of appointing some place and hour for the assembling of persons desiring vaccination, is by no means effectual in securing protection to the largest number;—because of the inconvenience of attending,—the absence of a realization of the benefit to be desired,—and the natural recklessness and indifference of many.

Visitation from house to house by the vaccinator, secures the best results.

The fear that some constitutional disease may be produced by transmission from one person to another, through the vaccine virus, humanized as so called, by being carried through successive vaccinations of persons for long periods of time, (and it is extremely doubtful that such events have ever occurred from virus properly taken,) may be entirely obviated by vaccinating with bovine virus, or that taken directly from the heifer.

Virus of either kind of warranted quality, can be readily procured in this city.

Respectfully,

CHAS. H. FISHER, Sec.

At an adjourned quarterly meeting held October 19, the extraordinary prevalence of Malaria, in different parts of the State, was the principal topic of discussion. The Secretary reported visits and examinations of the malarial territory around Mashapaug and Spectacle ponds. Beside the ponds and around them at variable distances, were smaller ponds or pools, and swampy or marshy grounds which during periods of heavy rains were more or less covered or saturated with water, and which supported during the summer months a heavy growth of coarse varieties of aquatic plants and grasses. There was no noticeable decomposition of vegetable growths or decay of the same from lack of sustenance. The conditions were the same as had existed for a long period of time. It seemed evident that either some long dormant or else imported germ, having organic characteristics, had found there at the present time congenial soil and conditions for rapid development and growth. Presumed to be organic because incapable of existence under a temperature of 32 to 30 degrees Farenheit. Even if the malarial poison be inorganic, and of gaseous tenuity and consistence, it must be evolved from organic structures or material, in which the process of gaseous evolution is arrested, at the frost point of atmospheric temperature.

The various surmises as to the cause of the Malaria, popular among the people inhabiting this district, were related. It did not appear that they had any foundation in fact. The report in circulation that the Secretary had ordered the water to be drawn off from Mashapaug, had just come to his knowledge and was entirely false. He did not know who had the authority to do that work, nor had he made any remark bearing such construction, as it was entirely opposed to his convictions. It was possible that there had been a misapprehension of the remark made to several persons, that if the pond had been drawn down to the lowest point at the close of winter, and kept down through the season, there would probably have been less sickness from Malaria. And that statement was all he could suggest as a possible relief for the future.

At this meeting the question of the safety of public houses in case of fire was also considered. It seemed desirable that an examination should be made of all the hotels and public houses of above two stories in height, especially the lighter and more inflammable structures at the summer resorts in the State, in regard to means of egress from each in case of fire. The means of supply of pure water, and modes and efficiency of removal of excremental and other refuse matter from the same premises was also discussed, but no action was taken.

At a special meeting held December 28th, a general review was given of the work of the closing year in the different departments of labor, and a final rendering of bills and closing of financial accounts.

BOOK EXCHANGES, 1881.

1	vol.	cloth,	Seventh Annual Report of the State Board of Health, Michigan	
1	"	paper,	Second Annual Report State Board of Health, Kentucky	
2	"	cloth,	38th and 39th Registration Reports of Massachusetts, for years	1879–1880
1	"	paper,	Rocky Mountain Health Resorts, by Charles Dennison, M. D., Colorado	
1	"	"	3rd Annual Beport of Board of Health, of Augusta, Ga.	1880
1	"	"	Annual Report, Health Officer, Burlington, Vt.	1880
1	"	"	Annual Reports, State Board of Health, Colorado	1879–1880
1	"	cloth,	First Biennial Report of State Board of Health, North Carolina	1879–1880
1	"	paper,	Fifth Annual Report of Board of Health, Utica, N. Y.	1880
1	"	"	Eighth " " Board of Health, Reading, Pa.	1880
4	"	"	Circulars 1, 2, 3 and 8 from Surgeon General's Office, U. S. A., Washington, D. C.	1868–1875
1	"	"	Second Annual Report of State Board of Health, Lunacy and Charity, Massachusetts	1880
1	"	"	Twelfth Annual Report, State Board of Charities and Corrections, Rhode Island	1880
1	"	cloth,	Rhode Island Manual, from Secretary of State	1881
1	"	"	Annual Report, Health Officer, District of Columbia	1880
7	"	paper,	Third Annual Report, State Board of Health, of Connecticut	1880
1	"	"	Eighth Annual Report, City Health Officer, New Haven, Conn	1880
1	"	"	Fourth Annual Report of the State Board of Health, New Jersey	1880
1	"	"	Annual Report of City Health Officer of Chicago, Ill	1880
1	"	"	Annual Report of Surgeon Gen. of the Marine Hospital Service, U. S.	1880
1	"	cloth,	Trichinæ and Trichinosis from the Agricultural Department, D. C	1881
1	"	paper,	Fifth Annual Report of the State Board of Health of Wisconsin	1880
1	"	cloth,	Annual Report of the State Board of Health, Alabama	1880
1	"	"	First Annual Report of the State Board of Health, Tennesee	1877-1880
1	"	paper,	First Annual Report of the State Board of Health of New York	1880
1	"	"	Third Annual Report of the State Board of Health of Kentucky	1880
1	"	cloth,	Annual Report City Board of Health, Philadelphia, Penn.	1880

1	vol. cloth,	Supplement, Second Annual Report of the State Board of Health of Massachusetts	1880
1	" paper,	Transactions of the New Hampshire Medical Society, June	1881
1	" "	Eighth Biennial Report of the Asylum for Feeble Minded, Illinois	1880
1	" "	First Annual Report of the Sanitary Reform Society, city of New York, N. Y.	1880
1	" "	Annual Report Board of Health of Hudson County, New Jersey	1880
1	" cloth,	Eighth Annual Report of the State Board of Health of Michigan	1880
1	" "	Report on the Statistics of Labor, Massachusetts	1880
1	" "	Report State Board of Education and Commissioner of Public Schools, Rhode Island	1880
2	" paper,	From Nathan Allen, M. D., Lowell, Mass.	
1	" "	House Drainage, Wm. Paul Gerhard, Newport, R. I.	
1	" "	Annual Report of Supt. of Health, Providence, R. I.	1880
1	" "	R. I. Historical Society	1880
		Also Health Reports of Brooklyn and Utica, N. Y., Boston, Mass., Charlestown, S. C., Saint Paul, Minn., Burlington, Vt., Chicago, Ill., Dayton, Ohio, Lansing, Mich., San Francisco, Cal., Baltimore, Ind., etc., etc. Also Periodicals, New England Medical Monthly, The Sanitary News, Nat. Board of Health Bulletin, etc.	

MEDICAL CORRESPONDENTS.

1881.

Dr. M. P. Arnold,
" D. H. Batchelder,
" J. C. Budlong,
" Otis Bullock,
" A. B. Briggs,
" H. J. Bruce,
" E. G. Carpenter,
" J. S. Chipman,
" G. L. Church,
" E. P. Clark,
" I. B. Cowen,
" H. C. Crandall,
Dr. J. H. Eldridge,
" R. P. Eddy,
" D. M. Edwards,
" G. R. Fisher,
" L. F. C. Garvin,
" E. V. Granger,
" Benj. Greene,
" G. B. Haines,
" G. A. Harris,
" G. W. Jenckes,
" A. E. Kemp,
" David King,
" D. O. King,
Dr. A. A. Mann,
" C. E. Maryott,
" A. Potter,
" F. A. Rankin,
" A. A. Saunders,
" T. H. Shipman,
" A. G. Sprague,
" W. J. Smith,
" G. H. Stanley,
" E. P. Stimson,
" J. O. Whitney,
" John Winsor,

REPORT ON THE REGISTRATION

OF

BIRTHS, MARRIAGES AND DEATHS,

IN THE

STATE OF RHODE ISLAND,

FOR THE

YEAR ENDING DECEMBER 31, 1880.

ALSO

COMMENTS UPON AND COMPARISONS OF THE SAME EVENTS FOR
VARIOUS PERIODS FROM 1852 TO 1880.

BY CHARLES H. FISHER, M. D.

STATE REGISTRAR OF VITAL STATISTICS.

TABLE I.

GENERAL ABSTRACT OF BIRTHS, MARRIAGES AND DEATHS,

IN THE STATE OF RHODE ISLAND DURING THE YEAR

1880.

TOWNS AND DIVISIONS OF THE STATE.	Population, 1880.	BIRTHS, 1880.							MARRIAGES, 1880.					DEATHS, 1880.												
			SEX.		PARENTAGE.					NATIVITY.					SEX.		PARENTAGE.		Ages Given.		Aggregate Age in yrs.		Average Age in years.			
		Whole Number.	Males.	Females.	American.	Foreign.	Am. Father. For. Mother.	For. Father. Am. Mother.	Whole Number.	American.	Foreign.	Am. Male. For. Female.	For. Male. Am. Female.	Whole Number.	Males.	Females,	American.	Foreign.	Males.	Females.	Males.	Females.	Males.	Females.	Aggregate Age in years, of all.	Average Age in years, of All.
Barrington	1,359	17	10	7	13	3	...	1	12	12	....	....	...	21	7	14	19	2	7	14	272	481	39.00	34.35	753	35.85
Bristol	6,028	181	106	75	102	61	10	8	30	20	7	2	1	121	60	61	66	55	60	61	1,849	2,153	30.71	33.66	4,002	33.07
Warren	4,007	80	34	46	31	42	5	2	55	33	15	5	2	77	37	40	64	13	35	40	1,215	1,936	34.74	48.40	3,151	42.00
BRISTOL CO.	11,394	278	150	128	146	106	15	11	97	65	22	7	3	219	104	115	149	70	102	115	3,336	4,570	32.70	40.00	7,906	36.43
Coventry	4,519	67	39	38	37	21	3	6	45	43	....	....	2	61	33	28	57	4	32	28	1,447	1,266	45.00	45.00	2,713	45.00
East Greenwich	2,887	53	29	24	29	17	4	3	43	21	17	3	2	53	28	25	39	14	28	25	1,314	1,062	47.00	42.50	2,367	44.83
West Greenwich	1,018	23	11	12	22	.....	1	....	8	8	..	....	..	23	9	14	23	......	9	14	429	749	47.66	53.50	1,178	48.27
Warwick	12,164	297	152	145	138	122	14	23	121	68	33	12	8	169	80	89	136	33	80	88	2,276	2,576	28.45	28.90	4,852	28.71
KENT CO	20,588	440	231	219	226	160	22	32	217	140	50	15	12	306	150	156	255	51	149	155	5,466	5,653	36.70	36.47	11,110	36.54
Jamestown	459	5	2	3	5	.....	....	....	2	2	....	...	....	2	1	1	2	......	1	1	54	41	54.00	41.00	95	47.50
Little Compton	1,202	14	7	7	12	1	...	1	3	3	....	....	....	15	9	6	15	......	9	6	650	335	72.22	55.56	985	65.67
Middletown	1,139	29	16	13	29	.....	....	....	6	6	....	....	....	16	8	8	16	......	8	8	395	469	49.37	58.62	864	54.00
New Shoreham	1,203	10	8	2	10	.....	....	....	13	13	....	....	....	6	2	4	6	......	2	4	164	184	82.00	46.00	348	58.00
Portsmouth	1,979	32	19	13	24	6	1	1	11	11	....	....	....	26	13	13	22	4	13	13	556	673	42.77	51.00	1,229	47.54
Tiverton	2,505	50	29	21	33	13	2	2	36	33	....	2	1	42	25	17	35	7	24	17	914	667	38.08	39.12	1,581	38.56
TOWNS, NEWPORT CO.	8,487	140	81	59	113	20	3	4	71	68	...	2	1	107	58	49	96	11	57	49	2,733	2,369	47.94	48.34	5,102	48.10
NEWPORT CITY	15,693	399	205	194	165	151	44	39	123	74	21	15	13	243	122	121	161	82	122	121	4,268	5,463	34.98	45.14	9,731	40.04

TOWNS AND DIVISIONS OF THE STATE.	Population, 1880.	BIRTHS, 1880.							MARRIAGES, 1880.					DEATHS, 1880.													
		Whole Number.	SEX.		PARENTAGE.				Whole Number.	NATIVITY.				Whole Number.	SEX.		PARENTAGE.		Ages Given.		Aggregate Age in yrs.		Average Age in years.		Aggregate Age in years, of All.	Average Age in years, of All.
			Males.	Females.	American.	Foreign.	Am. Father. For. Mother.	For. Father. Am. Mother.		American.	Foreign.	Am. Male. For. Female.	For. Male. Am. Female.		Males.	Females.	American.	Foreign.	Males.	Females.	Males.	Females.	Males.	Females.		
Burrillville	5,714	125	69	56	46	54	7	18	42	22	10	3	7	105	49	56	52	53	49	56	1,183	1,603	24.14	28.63	2,786	26.57
Cranston	5,940	120	64	56	68	39	5	8	22	13	4	2	3	146	84	62	69	77	83	61	2,643	2,507	31.44	38.81	5,150	35.34
Cumberland	6,445	143	73	70	41	81	9	12	56	22	20	6	8	107	60	47	37	70	60	47	1,476	1,235	24.60	26.28	2,711	25.34
East Providence	5,056	124	65	59	64	43	6	11	40	30	5	....	5	77	41	36	42	35	41	35	738	1,115	18.00	31.86	1,853	24 38
Foster	1,552	22	8	14	22	....	....	....	26	23	....	....	3	21	11	10	21	......	11	10	670	576	60.90	57.60	1,246	59.34
Glocester	2,250	46	29	17	20	26	....	....	19	13	2	3	1	42	25	17	29	13	25	17	983	771	39.72	45.35	1,754	41.76
Johnston	5,765	146	61	85	87	29	10	20	22	18	2	....	2	81	44	37	65	16	44	37	1,444	919	32.81	24.83	2,363	27.81
Lincoln	13,765	299	153	146	67	185	16	31	90	49	28	5	8	188	84	104	46	142	84	104	1,376	2,472	16.38	23.77	3.848	20.47
North Providence	1,467	29	13	16	13	12	3	1	....	....	....	....	....	16	5	11	10	6	5	11	181	360	36.20	32.73	541	33.81
North Smithfield	3,088	21	11	10	4	14	....	3	27	14	9	4	....	45	27	18	22	23	27	18	822	572	30.44	31.80	1,394	30 91
Pawtucket	19,030	404	202	202	149	164	39	52	204	112	49	23	20	351	175	176	145	206	174	176	4,821	5,177	27.39	29.42	9,998	28.41
Scituate	3,810	78	43	35	61	9	4	4	31	29	....	1	1	58	30	28	51	7	30	28	1,162	1,258	38.73	44.88	2,420	41.72
Smithfield	3,085	56	31	25	24	27	3	2	18	9	7	....	2	33	18	15	28	5	18	15	402	339	22.33	22.60	741	22.45
Woonsocket	16,050	371	182	189	60	273	16	22	187	94	70	12	11	318	152	166	83	235	152	166	2,484	3,113	16.45	18.64	5,597	17 60
TOWNS, PROV. CO.	93,017	1,984	1,004	980	726	956	118	184	784	448	206	59	71	1,588	805	783	700	888	803	781	20,385	22,017	25.38	28.18	42,402	27.40
PROVIDENCE CITY	104,857	2,626	1,361	1,265	1,055	1,088	199	284	1,231	760	246	91	134	2,080	988	1,092	920	1,160	988	1,092	28,448	33,249	28.72	30.45	61,697	29.67
Charlestown	1,117	13	7	6	10	1	....	2	13	13	...	....	. .	15	10	5	15	......	10	5	445	197	44.50	39.20	642	42.60
Exeter	1,310	30	13	17	27	1	....	2	14	13	....	1	....	20	10	10	19	1	10	10	334	373	33.40	37.30	707	35.35
Hopkinton	2,952	62	32	30	48	3	3	8	60	56	....	1	3	34	14	20	33	1	14	20	655	971	46.78	48.55	1,626	47.82
North Kingstown	3,949	90	44	46	72	11	5	2	35	34	....	1	....	67	30	37	55	12	30	37	1,196	1,291	39.87	33.57	2,487	37.12
South Kingstown	5,114	88	41	47	77	4	3	4	36	26	1	5	4	40	22	18	38	2	22	18	1,155	929	52.50	51.61	2,084	52.10
Richmond	1,949	41	22	19	31	7	....	3	3	3	....	....	....	33	17	16	29	4	17	16	561	675	33 33	42.19	1,236	37.45
Westerly	6,104	104	50	54	45	47	5	7	85	75	2	5	3	77	36	41	47	30	36	41	913	1,120	26.08	26.66	2.033	26.40
WASHINGTON CO.	22,495	428	209	219	310	74	16	28	246	220	3	13	10	286	139	147	236	50	139	147	5,259	5,556	37.83	37.82	10,815	37.82
COUNTIES.																										
Bristol	11,394	278	150	128	146	106	15	11	97	65	22	7	3	219	104	115	149	70	102	115	3,336	4,570	32.70	40.00	7,906	36.43
Kent	20,588	440	231	219	226	160	22	32	217	140	50	15	12	306	150	156	255	51	149	155	5,466	5,653	36.70	36.47	11,110	36.54
Newport	24,180	539	286	253	278	171	47	43	194	142	21	17	14	350	180	170	257	93	179	170	7.001	7,832	39 16	46.00	14,833	42.50
Providence	197,874	4,610	2,365	2,245	1,781	2,044	317	468	2,015	1,208	452	150	205	3,668	1,793	1,875	1,620	2,048	1,791	1,873	48,833	55,266	27.26	29.50	104,099	28.38
Washington	22,495	428	209	219	310	74	16	28	246	220	3	13	10	286	139	147	236	50	139	147	5,259	5,556	37.83	37.82	10,815	37.82
Whole State	276,531	6,295	3,241	3,054	2,741	2,555	417	582	2,769	1,775	548	202	244	4,829	2,366	2,463	2,517	2,312	2,360	2,460	59,895	78,877	29.62	32.06	148,763	30.86

Table II.—BIRTHS, 1880.

Arranged by Months, Sexes, and Divisions of the State.

MONTHS.	SEX.	Whole State.	DIVISIONS OF THE STATE.						
			Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.
January....	Males....	276	19	14	11	15	85	103	29
	Females..	238	12	13	5	14	68	110	16
	Total....	514	31	27	16	29	153	213	45
February...	Males....	250	14	23	6	11	71	98	27
	Females..	244	14	12	3	15	81	98	21
	Total....	494	28	35	9	26	152	196	48
March.....	Males....	270	18	12	4	15	79	130	12
	Females..	247	15	23	1	13	74	101	20
	Total....	517	33	35	5	28	153	231	32
April......	Males....	209	9	18	6	16	59	91	10
	Females..	231	10	14	9	12	78	94	14
	Total....	440	19	32	15	28	137	185	24
May.......	Males....	255	15	15	5	21	89	94	16
	Females..	277	6	20	4	16	96	114	21
	Total....	532	21	35	9	37	185	208	37
June.......	Males....	271	12	22	4	15	76	127	15
	Females .	240	7	17	3	12	71	114	16
	Total....	511	19	39	7	27	147	241	31
July.......	Males....	266	11	19	5	13	75	128	15
	Females..	265	8	18	11	18	78	108	24
	Total....	531	19	37	16	31	153	236	39

TABLE II.—BIRTHS, 1880.—Continued.

MONTHS.	SEX.	Whole State.	DIVISIONS OF THE STATE. Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.
August.....	Males.....	292	6	21	5	16	96	128	20
	Females..	252	10	22	6	16	84	90	24
	Total....	544	16	43	11	32	180	218	44
September..	Males....	279	8	22	7	20	103	107	12
	Females..	282	9	26	3	20	101	110	13
	Total....	561	17	48	10	40	204	217	25
October....	Males....	296	14	21	10	18	94	122	17
	Females..	258	19	14	5	13	92	98	17
	Total....	554	33	35	15	31	186	220	34
November..	Males....	272	12	19	8	18	83	113	19
	Females..	249	6	13	2	19	69	120	20
	Total....	521	18	32	10	37	152	233	39
December..	Males....	308	12	25	10	27	97	120	17
	Females..	268	12	17	7	26	85	108	13
	Total....	576	24	42	17	53	182	228	30
Whole year.	Males....	3,244	150	231	81	205	1,004	1,361	209
	Females..	3,051	128	209	59	194	980	1,265	219
	Total....	6,295	278	440	140	399	1,984	2,626	428

TABLE III.—PLURALITY BIRTHS, 1880.

ARRANGED BY MONTHS AND DIVISIONS OF THE STATE, AND SHOWING THE NATIVITY OF THE PARENTS.

MONTHS.	Number of Cases.	SEX.	No. of Children.	DIVISIONS OF THE STATE.						NATIVITY OF THE PARENTS.									
				Bristol County.	Newport Co., Towns.	Newport City.	Providence Co., Towns.	Providence City.	Washington Co.	American.	Irish.	English.	German.	Portuguese.	American father. Scotch mother.	American father. English mother.	Irish father. Eng. mother.	English father. Am. mother.	English father. Irish mother.
January........	5	Males....... 4 Females.. ... 6	10	1	....	....	1	3	....	2	3	....	....	....	....	....	....	....	....
February........	4	Males... .... 2 Females...... 6	8	....	1	1	1	1	...	2	2	....	....	....	....	....	....	....	....
March....	5	Males........ 8 Females...... 2	10	....	....	....	2	3	....	1	2	1	....	....	....	....	....	1	....
April....	3	Males........ 4 Females...... 2	6	....	....	....	1	2	....	1	2	....	....	....	....	....	....	....	....
May...	6	Males........10 Females...... 2	12	....	....	2	3	1	...	3	2	....	....	....	....	....	....	....	1
June............	5	Males........ 5 Females... .. 5	10	1	...	....	....	4	....	1	2	1	....	....	....	...	1	....	....
July............	5	Males... .... 2 Females...... 8	10	....	....	1	1	3	....	1	1	1	1	....	1	....	....	....	....
August..........	5	Males........ 4 Females...... 6	10	....	1	....	2	1	1	3	1	....	....	....	...	1	....	....	....
September.......	5	Males........ 5 Females... .. 5	10	....	....	....	1	4	....	2	2	....	....	1	....	....	....	....	.. .
October.	2	Males.. ..... 2 Females...... 2	4	2	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....
November.......	3	Males........ 3 Females.... . 3	6	....	....	....	2	2	....	....	1	1	....	1	....	....	....	....	....
December.... ...	5	Males....... 6 Females...... 4	10	....	....	2	1	1	....	2	2	....	....	....	....	....	....	1	....
Whole Year......	53	Males........55 Females. 51		4	2	6	15	25	1	20	20	4	1	2	1	1	1	2	1

TABLE IV.—MARRIAGES, 1880.

Arranged by Months and Divisions of the State.

MONTHS.	Whole State, 1880.	DIVISIONS OF THE STATE.							Whole State, 1879.
		Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.	
January........	205	5	17	3	10	49	105	16	217
February........	209	6	13	3	6	59	100	22	183
March..........	160	5	21	7	9	48	53	17	121
First Quarter....	574	16	51	13	25	156	258	55	521
April	228	8	15	10	15	66	98	16	198
May............	243	9	22	3	10	72	109	18	205
June............	234	11	23	6	5	61	111	17	208
Second Quarter..	705	28	60	19	30	199	318	51	611
July............	209	7	16	4	10	58	97	17	158
August.........	166	6	15	5	12	43	75	10	187
September......	255	7	15	4	12	75	115	27	209
Third Quarter...	630	20	46	13	34	176	287	54	554
October	259	12	16	6	10	79	108	28	221
November.......	344	16	34	8	16	92	148	30	292
December......	257	5	10	12	8	82	112	28	197
Fourth Quarter..	860	33	60	26	34	253	368	86	710
Whole Year.....	2,769	97	217	71	123	784	1,231	246	2,396

TABLE V.—AGES OF PERSONS MARRIED, 1880.

AGES OF MEN.	AGES OF WOMEN.												Whole Number of Males.
	Under 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 to 60.	60 to 65.	65 to 70.	Not stated.	
Under 20.....	77	24	1	....	....	..	..	..	..	..	..	..	102
20 to 25.......	373	597	93	11	3	..	..	..	..	..	..	..	1,077
25 to 30..	97	414	201	45	6	1	..	..	..	..	..	..	764
30 to 35.......	25	122	117	61	16	4	..	..	..	..	..	..	345
35 to 40.......	10	46	52	44	32	19	2	..	1	..	..	..	206
40 to 45.......	4	11	17	24	27	8	2	2	1	1	..	..	97
45 to 50... ...	...	4	10	12	17	6	12	2	1	..	..	..	64
50 to 55.......	....	3	2	10	13	11	6	4	1	2	..	..	52
55 to 60.......	....	.....	3	2	5	8	1	3	..	2	..	..	24
60 to 65.......	....	3	1	1	1	5	2	1	2	1	1	..	18
65 to 70.......	....	.....	1	....	3	2	2	..	1	2	1	1	13
70 to 75.......	....	.....	....	....	....	1	..	..	2	..	..	..	3
75 to 80..... .	....	. .	....	1	....	1	..	1	..	..	..	..	3
80 to 85......	....	.....	....	....	....	..	..	..	..	1	..	..	1
Not stated.....	....	.....	....	....	....	..	..	..	..	..	..	..	.....
Whole No. Females......	586	1,224	498	211	123	66	27	13	9	9	2	1	2,769

TABLE VI.—DEATHS, 1880.

Arranged by Months, Sexes, and Divisions of the State.

MONTHS.	SEX.	Whole State.	DIVISIONS OF THE STATE.						
			Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.
January.....	Males...	199	5	8	7	14	71	83	11
	Females.	223	4	8	7	18	70	118	8
	Total....	422	9	16	14	32	141	201	19
February....	Males...	200	9	14	7	6	56	97	11
	Females.	168	2	9	5	13	45	79	15
	Total....	368	11	23	12	19	101	176	26
March	Males...	209	12	10	3	9	71	95	9
	Females.	217	14	8	5	11	84	88	7
	Total....	426	26	18	8	20	155	183	16
April.......	Males...	192	5	20	3	8	60	86	10
	Females.	208	11	14	6	4	57	105	11
	Total....	400	16	34	9	12	117	191	21
May........	Males...	175	6	7	5	12	44	89	12
	Females.	217	8	14	5	12	67	100	11
	Total....	392	14	21	10	24	111	189	23
June........	Males...	177	4	14	3	9	68	68	11
	Females.	180	8	14	2	3	53	85	15
	Total....	357	12	28	5	12	121	153	26
July........	Males...	233	11	13	6	14	89	90	10
	Females.	255	13	14	3	15	88	118	4
	Total....	488	24	27	9	29	177	208	14
August......	Males...	208	14	17	1	11	77	74	14
	Females.	222	10	10	4	11	74	100	13
	Total....	430	24	27	5	22	151	174	27
September...	Males...	202	8	10	6	10	79	74	15
	Females.	186	7	13	4	14	63	69	16
	Total....	388	15	23	10	24	142	143	31
October.....	Males...	205	10	13	3	12	66	84	17
	Females.	211	16	19	3	14	73	69	17
	Total....	416	26	32	6	26	139	153	34
November...	Males...	187	12	11	9	7	64	74	10
	Females.	178	14	19	....	4	57	72	12
	Total....	365	26	30	9	11	121	146	22
December...	Males...	179	8	13	5	10	60	74	9
	Females.	198	8	14	5	12	52	89	18
	Total....	377	16	27	10	22	112	163	27
Whole Year..	Males...	2,366	104	150	58	122	805	988	139
	Females.	2,463	115	156	49	121	783	1,092	147
	Total....	4,829	219	306	107	243	1,588	2,080	286

Table VII.—DEATHS, 1880.

Showing the Number of each Sex, in each Period of Life, in every Town and Division of the State; also the Ratio of Deaths to Population.

TOWNS AND DIVISIONS OF THE STATE.	Population, 1880.		Deaths, 1880.			Under 1 year.	1 and under 2.	2 and under 3.
	Whole Number.	SEX.	Per cent. to Population.	Whole Number.	Sex.			
Barrington..........	1,359	Males....	1.54	21	7	2	...	1
		Females..			14	2	1	...
Bristol.............	6,028	Males....	2.01	121	60	13	4	2
		Females..			61	10	3	1
Warren..............	4,007	Males....	1.92	77	37	10	1	2
		Females..			40	5	...	...
Bristol County	11,394	Males....	1.92	219	104	25	5	5
		Females..			115	17	4	1
Coventry...........	4,519	Males....	1.35	61	33	5	3	1
		Females..			28	3	1	...
East Greenwich......	2,887	Males....	1.84	53	28	5	1	1
		Females..			25	2	3	...
West Greenwich.	1,018	Males....	2.26	23	9	....	1	...
		Females..			14	....	1	...
Warwick...........	12,164	Males....	1.39	169	80	17	6	5
		Females..			89	9	6	6
Kent County..... ..	20,588	Males....	1.49	306	150	27	11	7
		Females..			156	14	11	6
Jamestown..........	459	Males....	.44	2	1	....	...	...
		Females..			1	....	...	...
Little Compton......	1,202	Males....	1.25	15	9	....	...	...
		Females..			6	....	...	...
Middletown.	1,139	Males....	1.40	16	8	1	...	...
		Females..			8	1	...	...
New Shoreham	1,203	Males....	.49	6	2	....	...	...
		Females..			4	....	1	...
Portsmouth..........	1,979	Males....	.50	26	13	1	2	...
		Females..			13	1	...	...
Tiverton............	2,505	Males....	1.68	42	25	7	2	...
		Females..			17	2	...	...
Towns, Newport Co.	8,487	Males....	1.26	107	58	9	4	...
		Females..			49	4	1	...
Newport City......	15,693	Males. ..	1.54	243	122	27	5	3
		Females..			121	21	8	3

TABLE VII.—DEATHS, 1880.—Continued.

3 and under 4.	4 and under 5.	5 and under 10.	10 and under 15.	15 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and over.	Not stated.
....	....	....	....	....	2	....	....	....	....	2	....	....	....
1	1	....	....	1	1	1	....	2	2	1	....	1	....
1	4	2	2	3	4	3	4	3	5	4	6	1	...
....	3	....	3	4	6	5	3	5	6	6	6	....	....
....	....	1	....	1	2	4	1	4	2	2	6	1	1
....	....	2	....	....	4	3	2	6	8	6	3	....	....
1	4	3	2	4	8	7	5	7	7	8	12	...	1
1	3	2	3	5	11	10	5	13	16	13	8	3	....
1	....	....	....	....	2	....	2	8	5	4	2	....	....
....	...	2	....	3	3	3	2	2	5	4	....	....	....
....	....	....	....	2	2	3	....	....	2	7	5	....	...
....	....	....	2	...	3	3	1	2	....	5	3	1	....
....	1	1	....	...	....	....	....	2	....	2	2	....	....
....	1	2	....	....	2	1	....	....	1	4	....	2	....
3	2	3	...	1	9	6	4	5	8	9	1	1	....
4	....	13	1	2	6	10	8	7	2	7	4	2	2
4	3	4	....	3	13	9	6	15	15	22	10	1	....
4	1	17	3	5	14	17	11	11	8	20	7	5	2
....	....	....	....	....	....	....	....	1	....	....	....	....	....
....	....	....	....	....	....	....	1	....	....	....	....	....	....
....	....	....	1	....	....	....	....	....	....	4	4	....	....
....	....	....	....	....	...	2	1	...	1	1	1	....	....
....	....	....	....	1	1	....	1	....	1	2	1	....	....
....	....	....	....	....	1	....	....	1	2	1	1	1	....
....	...	....	....	....	....	....	....	....	....	....	2	....	...
....	....	....	....	...	...	1	....	....	....	2	....	....	....
....	....	....	1	....	1	2	....	....	3	1	2	....	....
....	....	....	1	1	1	2	....	....	1	3	3	....	....
....	....	1	....	....	....	2	2	...	4	3	3	....	1
1	....	2	....	1	....	2	2	1	2	3	1	....	....
....	....	1	2	1	2	4	3	1	8	10	12	....	1
1	...	2	1	2	2	7	4	2	6	10	6	1	....
3	2	6	2	3	11	6	8	7	16	20	3	....	....
....	....	4	....	5	5	10	10	8	13	14	18	2	....

Table VII.—DEATHS, 1880.—Continued.

TOWNS AND DIVISIONS OF THE STATE.	Population, 1880.		Deaths, 1880.			Under 1 year.	1 and under 2.	2 and under 3.
	Whole Number.	SEX.	Per cent. to Population.	Whole Number.	Sex.			
Burrillville.......	5,714	Males....	1.84	105	49	10	4	4
		Females..			56	9	1	6
Cranston.........	5,940	Males....	2.04	146	84	7	1	2
		Females..			62	4	1	...
Cumberland......	6,445	Males....	1.66	107	60	19	4	2
		Females..			47	12	2	2
East Providence...	5,056	Males....	1.52	77	41	13	7	2
		Females..			36	3	5	2
Foster............	1,552	Males....	1.37	21	11	....	1	1
		Females..			10	....	...	...
Glocester........	2,250	Males....	1.80	42	25	6	1	...
		Females..			17	2	...	...
Johnston.........	5,765	Males....	1.40	81	44	8	5	2
		Females..			37	6	4	1
Lincoln..........	13,765	Males....	1.37	188	84	24	9	6
		Females..			104	23	12	10
North Providence.	1,467	Males....	1.09	16	5	1	...	...
		Females..			11	2	...	...
North Smithfield..	3,088	Males....	1.45	45	27	4	2	2
		Females..			18	4	2	...
Pawtucket........	19,030	Males....	1.84	351	175	34	12	7
		Females..			176	31	14	10
Scituate..........	3,810	Males....	1.52	58	30	5	...	1
		Females..			28	3	2	1
Smithfield........	3,085	Males....	1.07	33	18	4	2	1
		Females..			15	1	1	...
Woonsocket.......	16,050	Males....	1.98	318	152	53	20	11
		Females..			166	33	21	13
Towns, Prov. Co.	93,017	Males....	1.70	1,588	805	188	68	41
		Females..			783	133	65	45
Providence City.	104,857	Males....	1.98	2,080	988	195	66	39
		Females..			1,092	188	80	36
Charlestown......	1,117	Males....	1.34	15	10	....	...	...
		Females..			5	....	2	...
Exeter...........	1,310	Males....	1.52	20	10	3	...	1
		Females..			10	3	...	...
Hopkinton.......	2,952	Males....	1.12	34	14	1	...	1
		Females..			20	2	...	...
North Kingstown.	3,949	Males....	1.70	67	30	3	...	2
		Females..			37	2	3	3
South Kingstown.	5,114	Males....	.78	40	22	2	...	...
		Females..			18	2	...	...
Richmond........	1,949	Males....	1.70	33	17	5	1	1
		Females..			16	2	...	1
Westerly.........	6,104	Males....	1.26	77	36	10	2	4
		Females..			41	8	3	1
Washington Co..	22,495	Males....	1.27	286	139	24	3	9
		Females..			147	19	8	5

TABLE VII.—DEATHS, 1880.—Continued.

3 and under 4.	4 and under 5.	5 and under 10.	10 and under 15.	15 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and over.	Not stated
5	1	4	2	....	3	1	2	2	4	5	2	....	....
2	1	9	2	2	1	2	3	2	6	8	2	....	....
1	1	3	....	....	12	9	5	13	13	9	6	1	1
2	3	3	....	3	3	11	12	1	3	9	5	1	1
3	2	4	2	1	2	2	3	2	5	6	3	....	....
3	....	2	....	4	5	4	2	2	2	5	2	....	1
....	1	4	1	2	....	1	1	1	....	6	2	....	....
....	1	2	....	3	1	4	3	5	3	1	2	....	....
....	....	...	....	....	...	....	1	...	2	2	3	1	....
....	....	....	....	....	1	1	2	1	1	4	....	.	....
....	....	2	....	1	3	2	....	2	3	3	2	....	....
....	...	1	...	....	3	2	....	4	....	2	1	2	...
1	...	4	....	....	3	2	1	3	6	7	....	1	1
1	1	4	1	2	2	2	4	3	3	1	1	....	1
5	4	8	1	2	7	3	4	2	4	2	2	1	. ..
3	2	6	4	4	5	6	6	4	5	10	2	2	....
....	....	...	1	....	....	....	1	....	2	....	....	....	....
1	..	1	....	...	2	2	....	....	1	1	1	....	....
2	1	2	....	1	2	....	1	2	4	2	2	....	....
1	....	1	....	....	....	1	3	3	1	1	1	....	.
3	8	14	5	4	15	17	9	17	8	11	9	....	2
7	5	7	5	5	14	21	7	9	15	14	10	2	....
....	....	2	....	2	2	2	2	5	3	5	1	....	...
1	....	1	....	1	3	1	....	1	4	4	6	....	....
....	....	1	....	1	4	....	1	2	1	1	....	....	....
1	....	4	2	1	1	1	1	....	...	....	1	1	....
6	2	7	...	3	9	6	8	7	8	5	6	1	....
5	6	7	9	5	15	11	9	7	12	9	4	...	....
26	20	55	12	17	62	45	39	58	63	64	38	5	4
27	19	48	23	30	56	69	52	42	56	69	38	8	3
32	29	65	17	24	89	77	85	64	88	77	32	9	....
32	35	70	24	28	118	92	71	84	76	97	49	12	....
....	....	1	....	1	....	....	1	....	1	2	2	....	2
....	....	....	1	....	....	....	....	....	...	....	2	....	....
...	....	1	....	....	....	....	1	....	2	2	....	....	....
....	1	....	....	...	....	1	1	....	2	1	1	....	....
....	....	1	...	1	1	....	....	1	3	1	2	1	....
1	1	2	....	....	....	2	1	....	4	3	4	....	1
....	1	2	1	....	4	4	....	2	6	....	5	....	....
1	2	3	....	1	4	4	2	2	....	5	4	1	....
....	....	....	....	1	2	....	1	1	4	4	4	1	2
....	....	....	1	....	....	1	2	2	1	4	4	....	1
....	....	1	....	....	1	...	...	....	2	4	1	....	1
....	1	...	....	....	4	....	1	....	2	2	3	....	....
1	2	3	1	....	1	1	2	....	2	1	5	1	....
1	....	6	2	2	3	2	3	1	3	2	4	....	....
1	3	9	4	3	9	5	5	4	20	14	19	3	4
3	5	11	4	3	11	10	10	5	12	17	22	1	2

TABLE VII—DEATHS, 1880.—RECAPITULATION BY COUNTIES.

COUNTIES.	POPULATION, 1880.			DEATHS, 1880.			Under 1 year.	1 and under 2.	2 and under 3.
	Whole Number.	SEX.		Per cent. to Population.	Whole Number.	SEX.			
BRISTOL CO...	11,394	Males...	5,438	1.92	219	104	25	5	5
		Females.	5,956			115	17	4	1
KENT CO.....	20,588	Males...	10,021	1.49	306	150	27	11	7
		Females.	10,567			156	14	11	6
NEWPORT CO..	24,180	Males...	11,574	1.45	350	180	36	9	3
		Females.	12,606			170	25	9	3
PROV. CO.....	197,874	Males...	94,921	1.85	3,668	1,793	383	134	80
		Females.	102,953			1,875	321	145	81
WASH. CO....	22,495	Males...	11,076	1.27	286	139	24	3	9
		Females.	11,419			147	19	8	5
WHOLE STATE.	276,531	Males...	133,030	1.75	4,829	2,366	495	162	104
		Females.	143,501			2,463	396	177	96

TABLE VII.—DEATHS, 1880.—RECAPITULATION BY COUNTIES.

3 and under 4.	4 and under 5.	5 and under 10.	10 and under 15.	15 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and over.	Not stated.
1	4	3	2	4	8	7	5	7	7	8	12	....	1
1	3	2	3	5	11	10	5	13	16	13	8	3	....
4	3	4	....	3	13	9	6	15	15	22	10	1	....
4	1	17	3	5	14	17	11	11	8	20	7	5	2
3	2	7	4	4	13	10	11	8	24	30	15	....	1
1	....	6	1	7	7	17	14	10	19	24	24	3	....
58	49	120	29	41	151	122	124	122	151	141	70	14	4
59	54	118	47	58	174	161	123	126	132	166	87	20	3
1	3	9	4	3	9	5	5	4	20	14	19	3	4
3	5	11	3	3	11	10	10	5	12	17	22	1	2
67	61	143	39	55	194	153	151	156	217	215	126	18	10
68	63	154	57	78	217	215	163	165	187	240	148	32	7

TABLE VIII.—CAUSES OF DEATH, 1880.

Arranged Alphabetically; showing the Number of each Sex, who died from each cause, in each Month and in the whole year 1880; also the Number of American and of Foreign Parentage, from each cause, for the year.

CAUSES OF DEATH.	PARENTAGE.			Jan.		Feb.		Mar.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.		SEX.		
	Am.	For.	Total.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
Accidents (various)	16	30	46	5	1	2	2	..	2	3	1	4	..	3	2	4	..	2	..	5	..	1	1	3	2	2	1	34	12	46
" Burns and Scalds	7	14	21	..	..	1	1	..	1	1		1	2	..	..	1	1	2	1	..	1	4	..	1	..	1	2	12	9	21
" Drowning	15	18	33	4	..	4	..	2	1	1	..	4	3	2	1	4	1	1	..	2	..	3	..	..	..	..	..	27	6	33
" Falls	6	8	14	2	..	1	..	..	..	1	..	..	1	1	..	..	1	2	..	1	..	2	1	..	1	..	..	10	4	14
" Poisoning	1	4	5	..	..	..	..	1	..	..	1	..	..	1	..	1	..	..	..	..	..	..	1	..	..	..	..	3	2	5
" Railroad	7	11	18	..	..	1	..	1	..	1	..	1	..	3	..	..	..	2	2	2	..	1	1	2	..	1	..	15	3	18
Abscesses	4	1	5	..	..	..	..	..	1	..	..	1	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	2	3	5
Aneurism	2	...	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	1	2
Anæmia	5	2	7	..	..	..	1	..	1	..	1	..	2	..	2	..	..	..	..	..	..	..	..	..	..	..	..	...	7	7
Apoplexy	87	32	119	5	6	3	3	3	5	3	3	5	6	2	6	5	5	3	2	4	3	11	9	10	6	5	6	59	60	119
Asthma	6	5	11	1	2	..	2	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	2	1	..	1	4	7	11
Bladder, Disease of	5	4	9	..	..	2	..	1	..	..	..	1	..	2	..	..	..	2	..	..	..	..	..	..	..	1	..	9	...	9
Bones, Disease of	5	1	6	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	1	1	..	..	..	2	..	..	..	5	1	6
Bowels, Disease of	4	5	9	..	..	2	1	1	..	..	..	..	..	..	..	2	..	..	..	2	1	..	..	..	..	..	..	7	2	9
Brain, Disease of	28	21	49	4	4	3	..	2	..	1	2	1	3	1	1	3	2	3	2	2	2	2	3	1	1	2	4	25	24	49
" Congestion of	16	8	24	..	1	..	..	4	..	3	..	3	2	1	..	..	2	..	2	..	..	..	3	..	1	2	..	13	11	24
" Inflammation of	43	45	88	11	7	5	1	2	3	4	3	6	4	4	2	5	4	2	3	2	4	2	3	3	2	3	3	49	39	88
Bronchitis	44	47	91	2	1	6	5	6	8	11	4	4	5	1	2	2	..	3	5	1	3	2	1	1	2	10	6	49	42	91
Cancer (various)	49	29	78	2	2	1	1	2	3	3	2	9	2	3	2	1	4	5	5	3	2	..	6	5	4	3	8	37	41	78
" of Breast	4	4	8	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	1	..	2	..	1	..	1	..	1	...	8	8
" of Stomach	10	8	18	2	..	..	1	..	..	..	1	..	..	3	..	1	1	..	3	1	..	1	1	..	1	..	2	8	10	18

CAUSES OF DEATH.	PARENTAGE.			Jan.		Feb.		Mar.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.		SEX.		
	Am.	For.	Total.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
Cancer of Uterus	10	11	21	..	5	..	1	..	..	..	1	..	1	..	5	..	..	..	4	..	..	..	2	..	1	..	1	...	21	21
Cancrum Oris	2	...	2	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	2
Catarrh	1	2	3	..	.	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	1	..	..	..	3	...	3
Child-birth	15	18	33	..	4	..	4	..	5	..	1	..	1	..	1	..	3	..	..	..	..	..	3	..	4	..	7	...	33	33
" Puerperal Convulsions.	2	1	3	..	1	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	...	3	3
" Puerperal Fever	6	9	15	..	2	..	3	..	..	..	1	..	2	..	1	..	..	..	..	..	2	..	1	..	..	..	3	...	15	15
Cholera Infantum	109	138	247	..	..	1	1	..	..	1	3	3	2	5	11	56	51	27	30	18	16	10	7	1	3	1	..	123	124	247
" Morbus	6	5	11	..	..	..	..	..	..	..	..	..	..	..	..	2	4	..	4	..	..	..	..	1	..	..	..	3	8	11
Chorea	2	1	3	..	..	..	..	..	..	..	..	..	1	..	..	..	2	..	..	..	..	..	..	..	..	..	..	...	3	3
Colic	2	3	5	..	..	..	..	2	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	1	..	..	..	5	...	5
Consumption	287	355	642	23	26	30	25	34	30	26	37	19	24	15	24	21	33	20	34	25	33	25	34	25	29	23	26	287	355	642
Convulsions	54	61	115	2	5	3	4	2	5	7	4	3	4	8	5	4	10	6	4	7	5	4	5	2	3	7	6	55	60	115
Croup	27	39	66	3	6	3	2	3	2	3	2	..	..	..	1	1	1	..	..	4	3	3	2	7	12	5	3	32	34	66
Cyanosis	3	...	3	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	2	1	3
Debility	58	60	118	6	5	6	1	6	6	2	7	..	6	5	4	6	8	12	8	6	4	3	2	1	2	5	7	58	60	118
" Birth Premature	11	13	24	1	1	..	..	..	..	3	2	1	1	4	..	3	2	..	2	2	..	1	..	1	..	..	..	16	8	24
Diabetes	12	3	15	..	1	..	..	..	1	..	..	..	..	..	..	..	2	1	3	..	1	2	..	1	1	2	..	6	9	15
Diarrhoea	25	35	60	..	..	..	..	..	2	1	2	..	..	2	..	12	9	5	8	7	6	1	1	2	..	1	1	31	29	60
" Chronic.	6	4	10	..	..	..	1	..	1	..	..	..	1	..	1	1	1	1	1	1	1	..	..	..	..	..	..	3	7	10
Diphtheria	75	77	152	8	9	4	7	8	3	6	5	3	5	4	4	8	3	3	6	9	10	8	10	6	6	6	11	73	79	152
Dropsy	23	14	37	1	1	..	1	2	2	2	2	.	3	2	3	2	1	2	5	1	2	..	..	..	2	3	..	15	22	37
" of Chest	7	2	9	..	..	..	..	..	..	2	..	1	..	..	2	..	..	..	..	1	..	2	..	1	..	..	..	7	2	9
Dysentery	18	9	27	..	..	..	..	..	..	..	3	..	1	4	1	4	2	4	3	..	1	2	2	..	..	..	..	14	13	27
" Typhoid	1	...	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	...	1
Embolism	3	1	4	.	..	..	..	..	..	..	..	..	..	1	..	..	1	1	..	..	1	..	..	..	..	..	..	2	2	4
Enteritis	15	18	33	2	3	3	..	2	.	2	..	1	2	..	1	2	1	4	5	..	..	..	..	2	2	1	..	19	14	33

TABLE VIII.—DEATHS, 1880.—Continued.

CAUSES OF DEATH.	PARENTAGE.			Jan.		Feb.		Mar.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.		SEX.		
	Am.	For.	Total.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
Epilepsy	8	6	14	..	2	1	..	..	..	1	1	..	..	..	1	..	..	..	..	2	..	1	1	1	1	1	1	7	7	14
Erysipelas	11	5	16	1	..	..	1	..	1	2	2	..	1	1	..	2	1	..	..	1	..	..	..	2	..	1	..	10	6	16
Exposure to cold	4	3	7	..	..	1	..	1	..	..	1	..	..	..	..	1	..	..	..	1	1	..	..	1	..	..	..	5	2	7
Fever	5	8	13	..	1	..	..	..	..	..	2	..	..	..	..	1	..	1	..	1	..	1	3	1	1	..	..	5	8	13
" Bilious	4	...	4	..	..	..	..	..	..	..	..	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	4
" Remittent	3	...	3	..	..	..	..	..	1	1	..	..	..	..	..		..	..	..	..	..	..	..	..	1	..	..	1	2	3
" Typhoid	80	56	136	1	4	4	4	4	8	2	4	2	7	5	5	2	2	6	5	12	11	16	14	8	6	5	6	64	72	136
" Yellow	1	...	1	.	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	...	1
" Typhus	1	...	1	..	..	..	..	..	..	..	..	..	..	.	..	..	..	..	..	..	..	..	..	..	..	1	..	1	...	1
Fits	14	4	18	..	1	..	..	..	1	4	1	..	1	1	..	1	2	1	..	..	..	..	2	1	..	2	..	10	8	18
Gangrene	6	1	7	..	1	..	..	..	1	..	..	..	..	1	.	..	..	1	..	1	..	..	..	..	..	1	1	4	3	7
" Senile	2	...	2	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	1	1	2
Heart, Diseases of	138	81	219	13	9	19	9	10	9	10	10	9	8	7	9	8	4	10	6	6	9	8	6	9	13	10	8	119	100	219
" Hypertrophy of	8	4	12	1	1	..	..	..	..	..	..	1	..	..	2	1	..	..	..	.	..	..	..	2	2	1	1	6	6	12
Heat	...	1	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	...	1
Hemorrhage	8	8	16	3	2	..	..	1	2	1	1	..	1	..	..	..	2	1	..	..	..	..	1	..	..	1	..	7	9	16
" from Lungs	5	5	10	..	..	..	..	..	..	..	..	1	..	..	1	1	..	..	..	..	..	..	..	1	1	5	..	4	6	10
Hernia	4	4	8	1	..	..	1	..	..	1	..	1	..	..	1	..	..	2	..	..	..	..	..	..	..	..	1	5	3	8
Hip-Joint, Disease of	2	...	2	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	1	1	2
Hooping Cough	7	13	20	..	1	..	1	..	1	..	..	..	2	..	..	1	2	1	1	2	..	..	..	2	1	4	1	10	10	20
Hydrocephalus	23	23	46	2	1	1	4	1	2	3	2	2	2	2	2	1	3	2	2	4	1	1	2	4	..	..	2	23	23	46
Influenza	1	...	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...	1	1
Insanity	13	6	19	2	..	1	..	..	2	..	..	1	2	1	..	1	2	..	2	2	1	..	1	1	..	..	..	9	10	19

CAUSES OF DEATH.	PARENTAGE.			Jan.		Feb.		Mar.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.		SEX.		
	Am.	For.	Total.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
Intemperance	5	9	14	..	..	..	1	3	..	..	1	..	..	1	..	1	..	1	1	2	..	..	1	..	..	..	2	8	6	14
" Delirium Tremens.	...	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	...	1
Jaundice	2	1	3	..	..	..	..	1	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3
Kidneys, Disease of	21	14	35	3	3	4	1	3	1	..	..	1	1	1	1	1	1	..	1	..	1	3	..	3	.	1	5	20	15	35
" Bright's Disease of.	30	26	56	1	2	1	1	2	1	3	3	1	3	3	1	1	.	4	1	4	1	4	3	6	4	2	4	32	24	56
Laryngitis	4	4	8	..	..	2	1	..	..	..	..	1	..	..	..	1	..	..	..	..	..	1	..	..	1	1	..	6	2	8
Leucocythæmia	1	...	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	...	1
Liver, Disease of	34	15	49	2	1	1	..	2	4	4	1	1	4	2	..	..	3	1	..	3	4	5	5	1	2	2	1	24	25	49
" Inflammation of	4	2	6	..	..	1	..	..	..	1	..	1	..	..	1	..	..	..	..	..	1	..	..	..	..	1	..	4	2	6
Lungs, Disease of	8	5	13	..	..	1	..	1	..	1	2	1	1	..	1	..	1	..	2	..	..	..	..	..	..	2	.	6	7	13
Malformations (all kinds)	8	5	13	1	..	1	..	1	..	1	..	..	1	..	1	1	1	1	..	1	..	..	..	1	1	..	1	8	5	13
Marasmus	34	24	58	2	1	3	2	2	4	2	..	2	2	1	3	7	4	4	2	3	4	4	2	..	2	1	..	31	27	58
Measles	2	7	9	..	..	..	..	..	..	..	..	..	1	..	1	..	1	1	1	1	..	..	..	..	1	1	1	3	6	9
Meningitis Cerebro Spinal	12	8	20	1	1	1	1	..	2	1	..	..	2	..	1	2	1	1	..	..	..	1	1	1	1	..	2	8	12	20
" Spinal	2	1	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	1	..	..	..	..	...	3	3
Murder	...	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	...	1	1
Neuralgia	1	...	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	...	1	1
Old Age	186	87	273	9	16	11	12	11	23	9	12	8	15	16	8	7	12	13	11	6	7	14	17	11	7	8	12	121	152	273
Obstruction of Bowels	3	1	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	1	..	..	..	..	3	1	4
Paralysis	70	26	96	7	3	1	1	5	7	5	4	6	2	3	4	2	5	4	5	2	4	6	4	3	5	6	2	50	46	96
Peritonitis	11	13	24	..	1	1	2	..	2	1	1	..	1	2	1	..	3	..	3	..	2	..	1	1	..	2	..	7	17	24
Pleurisy	6	2	8	..	..	..	1	..	..	1	..	3	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	4	8
Pneumonia	155	168	323	15	16	14	12	28	20	20	28	17	22	13	15	4	6	5	4	5	4	13	10	11	13	13	14	159	164	323
" Congestion of Lungs.	22	19	41	3	1	2	..	3	3	3	1	2	1	1	2	..	3	1	1	2	1	3	5	1	..	1	2	21	20	41
Prostrate, Disease of	4	...	4	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	..	..	4	...	4
Purpura Hemorrhagica.	2	4	6	1	..	..	..	2	.	..	1	..	..	1	..	..	..	..	..	1	..	..	.	..	:	..	..	5	1	6
Potts Disease	1	...	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...	1	1

TABLE VIII.—CAUSES OF DEATH, 1880.—Continued.

CAUSES OF DEATH.	PARENTAGE.			Jan.		Feb.		Mar.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.		SEX.		
	Am.	For.	Total.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
Pyæmia	1	...	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	...	1	1
Quinsy	1	...	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	...	1
Rheumatism	12	12	24	1	2	..	1	..	1	1	4	1	..	1	..	..	1	1	1	1	..	1	3	1	1	..	2	8	16	24
Scarlatina	216	252	468	29	46	31	24	24	27	18	26	23	28	14	17	14	18	9	17	10	9	13	11	17	12	13	13	215	253	468
Scrofula	8	3	11	..	..	2	..	..	1	..	..	..	..	..	2	..	..	..	..	..	1	2	1	..	1	..	1	4	7	11
Skin, Disease of	1	1	2	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	...	2	2
Spine, Disease of	4	3	7	..	..	2	..	..	..	..	..	1	..	..	1	..	..	1	..	..	1	..	..	..	..	1	..	5	2	7
Stomach, Disease of	5	5	10	..	1	..	1	1	1	1	..	1	..	1	..	..	1	1	1	..	..	..	..	..	..	..	..	5	5	10
" Inflammation of	9	9	18	..	1	..	..	..	1	..	..	1	2	..	..	1	3	1	1	..	3	1	1	..	..	..	2	4	14	18
Suicide	8	2	10	..	..	1	..	1	1	1	..	..	..	1	1	..	2	..	1	..	..	..	..	..	1	..	..	5	5	10
Sunstroke	1	...	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	...	1
Syphilis	4	3	7	..	..	..	..	1	..	..	..	..	..	..	..	2	1	..	1	..	..	..	..	..	..	..	2	3	4	7
" Congenital	2	1	3	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	1	2	3
Tabes Mesenterica	2	1	3	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	1	2	3
Teething	9	16	25	..	..	1	1	..	1	..	1	..	..	..	2	3	1	6	2	..	2	1	..	1	1	1	1	13	12	25
Tetanus and Tris. Nascen	2	1	3	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	2	1	3
Tuberculosis	7	5	12	..	1	1	1	..	2	..	1	..	..	1	..	..	1	1	1	..	2	..	..	..	..	..	.	4	8	12
Tumor	9	8	17	..	2	..	2	..	..	.	3	1	1	..	..	..	..	..	1	..	2	..	..	1	2	..	2	2	15	17
Uterus, Disease of	4	3	7	..	2	..	..	..	..	..	1	..	1	..	2	..	..	..	..	..	..	..	..	..	..	..	1	...	7	7
Unknown	92	141	233	14	6	8	12	14	2	6	6	9	10	14	8	14	10	13	2	21	10	9	13	11	7	11	3	144	89	233

TABLE IX.—CAUSES OF DEATH, 1880.

Arranged Alphabetically; showing the Number of each Sex, who died from each cause, in each Period of Life.

CAUSES OF DEATH.	Under 1.		1 and under 2.		2 to 5.		5 to 10.		10 to 15.		15 to 20.		20 to 30.		30 to 40.		40 to 50.		50 to 60.		60 to 70.		70 to 80.		80 and over.		Age not stated.		SEX.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
Accidents (various)	5	4	..	1	1	1	..	1	2	..	3	1	3	..	5	..	6	1	2	..	4	1	2	1	..	1	1	..	34	12	46
" Burns and Scalds	1	..	1	1	3	1	1	3	1	..	..	1	2	2	1	..	1	1	1	..	..	..	..	..	..	..	..	..	12	9	21
" Drowning	..	..	..	..	1	2	10	2	3	1	1	..	4	1	3	..	2	..	2	..	..	..	..	..	..	..	1	..	27	6	33
" Falls	1	..	..	..	1	1	..	..	..	..	..	..	1	..	1	1	1	1	2	..	..	..	1	1	2	..	..	..	10	4	14
" Poisoning	2	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	3	2	5
" Railroad	..	1	..	..	..	..	1	..	..	..	..	..	3	.	5	..	3	1	2	.	..	..	1	..	..	..	..	1	15	3	18
Abscesses	1	2	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	2	3	5
Aneurism	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	1	1	2
Anæmia	..	1	..	..	..	1	..	..	..	..	..	..	..	1	..	1	..	2	..	..	..	1	..	..	..	..	..	..	...	7	7
Apoplexy	..	..	..	..	..	..	..	..	..	..	..	..	..	1	3	3	4	5	8	7	18	18	18	20	7	6	1	..	59	60	119
Asthma	1	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	2	1	2	..	1	..	1	..	..	4	7	11
Bladder, Disease of	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	3	..	4	..	1	..	..	..	10	...	10
Bones, Disease of	..	..	..	..	1	..	..	..	..	..	1	..	1	..	2	..	..	..	..	..	..	1	..	..	..	..	..	..	5	1	6
Bowels, Disease of	4	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	1	..	..	1	..	..	7	2	9
Brain, Disease of	5	2	1	4	4	1	..	..	..	..	..	..	3	1	1	2	1	6	2	1	3	1	3	3	2	3	..	..	25	24	49
" Congestion of	2	2	2	2	2	..	..	3	..	..	..	..	..	1	1	..	1	..	2	..	2	..	1	2	..	1	..	..	13	11	24
" Inflammation of	19	17	6	6	9	12	10	2	2	..	2	..	..	..	1	..	..	..	..	..	..	2	..	..	..	..	..	..	49	39	88
Bronchitis	16	13	7	3	3	2	2	..	2	..	..	..	1	2	1	1	3	1	5	2	2	5	4	8	3	5	..	..	49	42	91
Cancer (various)	..	..	..	..	..	..	..	..	..	..	..	..	1	1	3	7	3	7	6	7	13	7	8	9	3	2	..	..	37	41	78
" of Breast	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	3	..	1	..	2	..	..	..	..	..	..	...	8	8
" of Stomach	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	1	1	1	1	4	3	3	1	..	..	..	8	10	18

TABLE VIII.—CAUSES OF DEATH, 1880.—Continued.

CAUSES OF DEATH.	Under 1.		1 and under 2.		2 to 5.		5 to 10.		10 to 15.		15 to 20.		20 to 30.		30 to 40.		40 to 50.		50 to 60.		60 to 70.		70 to 80.		80 and over.		Age not stated.		SEX.		
	M.	F,	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
Cancer of Uterus	...	..	..	..	..	..	..	..	..	..	..	..	..	2	..	3	..	3	..	9	..	2	..	2	..	..	..	..	...	21	21
Cancrum Oris	1	1	..	..	..	..	..	..	..	..	..	..	..	...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	2
Catarrh	1	..	2	..	..	..	..	..	..	..	..	..	..	...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	...	3
Child-birth	...	..	..	..	..	..	..	..	..	..	..	2	..	17	..	12	..	2	..	..	..	..	..	..	..	..	..	..	...	33	33
" Puerperal Convulsions.	...	..	..	..	..	..	..	..	..	..	..	..	..	2	..	1	..	..	..	..	..	..	..	..	..	..	..	..	...	3	3
" Puerperal Fever	...	..	..	..	..	..	.	..	..	..	..	..	..	8	..	5	..	2	..	..	..	..	..	..	..	..	..	..	...	15	15
Cholera Infantum	100	80	23	44	..	..	..	..	..	..	..	..	..	...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	123	124	247
" Morbus	...	1	..	..	..	..	1	..	..	..	..	..	1	...	..	2	1	..	..	1	..	3	..	1	..	..	..	..	3	8	11
Chorea	...	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	1	..	..	..	..	...	3	3
Colic	...	..	1	..	..	..	1	..	..	..	1	..	..	...	1	..	..	..	1	..	..	..	..	..	..	..	..	..	5	...	5
Consumption	6	6	4	7	4	3	..	3	4	10	16	28	93	106	52	83	40	42	30	20	29	26	4	16	4	5	1	..	287	355	642
Convulsions	34	30	13	9	6	15	2	2	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	1	..	..	55	60	115
Croup	6	8	8	5	11	15	7	5	..	1	..	..	..	...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	32	34	66
Cyanosis	2	1	..	..	..	..	..	..	..	..	..	..	..	...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	3
Debility	34	29	3	3	..	..	1	1	..	1	..	2	1	1	1	..	3	3	3	8	5	5	5	3	..	4	2	..	58	60	118
" Birth Premature	16	8	..	..	..	..	..	..	..	..	..	..	..	...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16	8	24
Diabetes	...	..	..	..	1	..	..	..	..	1	..	..	..	...	..	1	..	1	1	2	2	1	2	3	..	..	:	..	6	9	15
Diarrhœa	18	12	3	8	4	2	1	..	..	1	..	..	..	...	..	..	..	..	..	..	3	2	2	..	..	4	..	..	31	29	60
" Chronic	...	..	..	..	..	..	..	..	..	..	..	..	..	...	..	1	..	..	..	2	2	3	1	1	..	..	..	..	3	7	10
Diphtheria	8	7	8	8	30	25	22	20	1	13	1	5	3	...	..	1	..	..	..	..	..	..	..	..	..	..	..	..	73	79	152
Dropsy	...	..	..	..	1	..	1	1	..	2	..	..	2	...	..	1	1	3	3	5	2	3	4	5	1	2	..	..	15	22	37
Dropsy of Chest	1	..	..	..	..	..	..	..	..	..	..	..	1	...	2	..	..	1	..	..	1	..	1	1	1	..	..	..	7	2	9
Dysentery	2	2	4	1	3	1	..	1	..	..	1	..	..	...	..	..	..	2	1	2	1	2	1	2	1	..	..	..	14	13	27

CAUSES OF DEATH.	Under 1.		1 and under 2.		2 to 5.		5 to 10.		10 to 15.		15 to 20.		20 to 30.		30 to 40.		40 to 50.		50 to 60.		60 to 70.		70 to 80.		80 and over.		Age not stated.		SEX.		
	M.	F.	M.	F.	M.	F.	M.	F	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
Dysentery, Typhoid													1																1		1
Embolism													1		1	1		1											2	2	4
Enteritis	3	5			6	2							1		1	2	3	2	1			2	3	1	1				19	14	33
Epilepsy		1							1		1		1	1	1	4					3			1					7	7	14
Erysipelas	2												1	1	1		2	1			2	1	2	2		1			10	6	16
Exposure to cold	2			1														1			1		2						5	2	7
Fever	1				2	3			1							1	1	3		1									5	8	13
" Bilious					1					1									1	1									2	2	4
" Remittent	1									1		1																	1	2	3
" Typhoid		1		4	5	1	2	4	4	5	9	14	27	16	8	14	3	4	4	3	1	3		3			1		64	72	136
" Yellow																	1												1		1
" Typhus																					1								1		1
Fits	1	3	1			2	1				2		2	1	1			1					2	1					10	8	18
Gangrene																	1				1		2	3					4	3	7
" Senile																							1			1			1	1	2
Heart, Diseases of	5	2					2		3		1	2	4	6	11	6	10	12	15	18	30	19	24	25	14	10			119	100	219
" Hypertrophy of															1			1			1	2	1	1	3	1		1	6	6	12
Heat																	1												1		1
Hemorrhage	6	2												4				1		1	1			1					7	9	16
" from Lungs						1									2	1			1	3	1	1							4	6	10
Hernia	1		1													1	1					1	2			1			5	3	8
Hip-Joint, Disease of											1													1					1	1	2
Hooping Cough	4	8	2	1	4			1																					10	10	20
Hydrocephalus	10	8	10	6	2	4	1	3		1						1													23	23	46
Influenza																								1						1	1

CAUSES OF DEATH. 1880.—Continued.

CAUSES OF DEATH.	Under 1.		1 and under 2.		2 to 5.		5 to 10.		10 to 15.		15 to 20.		20 to 30.		30 to 40.		40 to 50.		50 to 60.		60 to 70.		70 to 80.		80 and over.		Age not stated.		SEX.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
Insanity												1		1		1	2	1	1	2	4	1	2	3					9	10	19
Intemperance													1		3			5	3	1	1								8	6	14
" Delirium Tremens.																	1												1	...	1
Jaundice																	1			1				1					1	2	3
Kidneys, Disease of	1					2		1		1				1	2	1	1	2	3	3	7	3	4	1	2				20	15	35
" Bright's Disease of			1			1	1			1		1	2	2	5	2	4	2	5	7	10	6	4	1		1			32	24	56
Laryngitis	1	1	3		1						1					1													6	2	8
Leucocythæmia																	1												1	...	1
Liver, Disease of	1					1				2			3		2	2	5	3	4	5	4	8	4	4	1				24	25	49
" Inflamation of								1										1			2		2						4	2	6
Lungs, Disease of	1	1					1			2			1	2		1	1	1			2								6	7	13
Malformations, (all kinds)	8	5																											8	5	13
Marasmus	26	24	3	3	2																								31	27	58
Measles	1	1		1	2	1		2										1											3	6	9
Meningitis Cerebro-Spinal.	1	3	1	2	2	1	1	2	1	1			1	1		1			1					1					8	12	20
" Spinal		1																1						1					...	3	3
Murder																1													...	1	1
Neuralgia																1													...	1	1
Old age																						1	41	47	80	104			121	152	273
Obstruction of Bowels							1				1		1			1													3	1	4
Paralysis	1													1	1	1	6	3	3	3	14	9	14	18	11	10		1	50	46	96
Peritonitis	1		1					1	1		1	2	1	1	1	5		1		2	1	2	1			2			7	17	24
Pleurisy	1			1										1		1	1		2			1							4	4	8

CAUSES OF DEATH.	Under 1.		1 and under 2.		2 to 5.		5 to 10.		10 to 15.		15 to 20.		20 to 30.		30 to 40.		40 to 50.		50 to 60.		60 to 70.		70 to 80.		80 and over.		Age not stated.		SEX.		
	M.	F,	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.
Pneumonia	22	20	9	9	10	8	7	8	..	2	4	12	7	6	15	14	19	15	24	22	20	21	18	20	4	7	..	..	159	164	323
" Congestion of Lungs.	4	4	2	1	1	5	1	1	1	..	..	..	..	1	1	3	2	1	..	..	3	3	5	..	1	..	..	1	21	20	41
Prostate, Disease of	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	3	..	..	..	..	.	4	...	4
Purpura Hemorrhagica	3	1	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	5	1	6
Pott's Disease	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	...	1	1
Pyæmia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	...	1	1
Quinsy	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	...	1
Rheumatism	..	..	..	..	1	..	..	..	..	..	1	..	1	1	3	..	1	2	1	2	..	3	..	5	..	3	..	..	8	16	24
Scarlatina	25	24	24	36	89	93	56	73	11	10	3	3	5	4	..	..	1	..	1	..	..	..	..	..	..	..	..	..	215	253	468
Scrofula	2	2	1	..	..	..	..	..	..	1	..	..	..	1	..	1	..	..	..	1	..	1	1	..	..	..	..	..	4	7	11
Skin, Disease of	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	...	2	2
Spine, Disease of	..	1	..	..	1	1	..	..	..	..	1	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	5	2	7
Stomach, Disease of	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	2	3	1	1	1	..	..	..	..	5	5	10
" Inflammation of	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	3	2	4	2	2	..	3	..	..	..	..	4	14	18
Suicide	..	..	..	..	..	..	..	..	..	..	1	..	..	2	..	1	1	1	2	1	1	..	..	..	..	..	..	..	5	5	10
Sunstroke	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	1	...	1
Syphilis	2	..	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..	1	..	..	1	..	..	..	..	..	..	..	3	4	7
" Congenital	1	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3
Tabes Mesenterica	1	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3
Teething	10	9	3	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	13	12	25
Tetanus and Tris. Nascen	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	1	3
Tuberculosis	1	..	..	..	..	..	1	..	..	1	..	1	..	1	1	3	1	..	..	..	..	..	..	..	..	..	..	..	4	8	12
Tumor	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	..	1	1	2	..	3	..	3	1	1	..	..	2	15	17
Uterus, Disease of	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	1	..	1	..	3	..	..	..	..	..	..	..	..	...	7	7
Unknown	64	39	14	5	18	17	5	13	1	2	2	2	11	5	5	7	5	1	6	6	7	1	2	7	1	2	3	2	144	89	233

TABLE X.—CLASSIFICATION AND PERCENTAGE—1880.

Showing what part of the Mortality in the whole State, and in each Division is ascribed to each cause and class of causes.

Number of Deaths in each Division of the State.										Percentage of Deaths in each Division.						
Bristol County.	Kent County.	Newport County Towns.	Newport City.	Providence County Towns.	Providence City.	Washington County.	Whole State.	Causes of Death.	Percentage in the Whole State.	Washington County.	Providence City.	Providence County Towns.	Newport City.	Newport County Towns.	Kent County.	Bristol County.
219	306	107	243	1,588	2,080	286	4,829	All Causes…………………								
209	293	105	219	1,437	2,063	270	4,596	Specified Causes………………	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
55	71	13	38	451	576	87	1,291	I. ZYMOTIC DISEASES………	28.09	32.22	27.82	31.41	17.35	12.38	24.23	26.31
								SPORADIC DISEASES.								
31	24	12	31	158	184	22	462	II. GENERAL OR NOT LOCALIZED	10.04	8.14	8.93	10.92	14.15	11.43	8.13	14.84
30	37	19	32	203	251	27	599	III. NERVOUS SYSTEM………	13.02	10.00	12.18	14.14	14.62	18.09	12.54	14.35
51	76	21	42	320	594	56	1,160	IV. RESPIRATORY SYSTEM……	25.22	20.75	28.80	22.29	19.18	20.00	26.05	24.41
7	21	6	24	61	107	9	237	V. CIRCULATORY SYSTEM……	5.15	3.33	5.20	4.27	10.97	5.72	7.20	4.31
6	10	9	15	53	93	13	199	VI. DIGESTIVE SYSTEM………	4.33	4.81	4.51	3.68	6.84	8.59	3.41	2.87
3	8	3	9	36	59	2	120	VII. URINARY SYSTEM………	2.65	.74	2.87	2.50	4.10	2.87	2.71	1.44
4	4	3	…	9	20	3	43	VIII. GENERATIVE SYSTEM……	0.94	1.11	.98	.63	……	2.86	1.37	1.91
2	4	…	2	8	22	2	40	IX. LOCOMOTIVE SYSTEM…….	0.87	.74	1.07	.56	.91	……	1.37	0.94
…	…	…	…	…..	2	…	2	X. INTEGUMENTIVE SYSTEM….	.04	……	.09	……	……	….	……	……
12	20	15	19	90	73	44	273	XI. OLD AGE………………	5.95	16.30	3.56	6.25	8.68	14.25	6.83	5.75
6	18	4	7	48	82	5	170	XII. EXTERNAL CAUSES…. …	3.70	1.86	3.99	3.35	3.20	3.81	6.16	2.87

								I. Zymotic Diseases.								
13	11	3	7	93	100	20	247	Cholera Infantum	5.43	7.41	4.84	6.47	3.20	2.86	3.75	6.22
1	...	...	...	6	4	...	11	Cholera Morbus	0.24	...	.19	.42	...	...	...	.48
3	3	1	3	20	30	6	66	Croup	1.45	2.21	1.45	1.39	1.37	.95	1.02	1.44
1	1	...	10	24	30	4	70	Diarrhœa	1.52	1.48	1.45	1.67	4.56	...	.34	.48
3	6	...	2	63	61	17	152	Diphtheria	3.40	6.30	2.94	4.38	.91	...	2.05	1.44
3	5	...	...	8	12	...	28	Dysentery	.61	...	.58	56	...	...	1.71	1.44
...	2	1	...	4	8	1	16	Erysipelas	.34	.37	.38	.28	...	.95	.68	...
...	1	1	...	9	1	1	13	Fever	.30	.37	.04	.63	...	.95	.34	...
...	1	...	...	1	1	1	4	Fever, Bilious	.09	.37	.04	.07	...	...	.34	...
...	...	...	1	2	12	...	15	Fever, Puerperal	.33	...	.58	.14	.46	...	...	...
...	1	...	...	...	1	1	3	Fever, Remittent	.06	.37	.04	...	...	...	.34	...
8	8	...	3	57	49	12	137	Fever, Typhoid and Typhus	2.99	4.44	2.37	3.97	1.37	...	2.73	3.82
...	1	...	...	...	...	...	1	Fever, Yellow	.02	...	...	...	...	...	.34	...
...	...	...	2	6	11	1	20	Hooping Cough	.44	.37	.52	.42	.91	...	...	...
...	...	...	...	6	3	...	9	Measles	.20	...	.14	.42	...	...	...	...
1	1	2	2	5	5	4	20	Meningitis, Cerebro-Spinal	.44	1.48	.24	.36	.91	1.90	.34	.48
...	...	...	1	...	...	...	1	Pyæmia	.02	...	...	...	.46	...	...	...
22	30	4	7	143	243	19	468	Scarlatina	9.99	7.05	11.78	9.94	3.20	3.80	10.25	10.51
...	...	1	...	4	5	...	10	Syphilis	.22	...	.24	.28	...	.95	...	...
55	71	13	38	451	576	87	1,291	Total	28.09	32.22	27.82	31.40	17.35	12.38	24.23	26.31
								II. General or not Localized.								
...	...	...	...	...	4	1	5	Abscesses	.10	.38	.19	...	...	...	...	...
...	...	...	...	3	3	1	7	Anæmia	.15	.38	.15	.20	...	...	...	...
5	10	2	10	26	68	4	125	Cancer	2.72	1.49	3.30	1.80	4.54	1.90	3.40	2.28
...	...	...	...	...	3	...	3	Cyanosis	.07	...	.15	...	...	...	...	...
9	5	2	8	84	27	7	142	Debility	3.09	2.59	1.31	5.83	3.73	1.90	1.68	4.30
6	1	3	2	18	5	2	37	Dropsy, General	.81	.76	.24	1.24	.91	2.88	.34	2.88
...	1	2	2	1	...	3	9	Gangrene	.19	1.02	...	.07	.91	1.90	.34	...

TABLE X.—CLASSIFICATION AND PERCENTAGE, 1880.—Continued.

Number of Deaths in each Division of the State.										Percentage of Deaths in each Division.						
Bristol County.	Kent County.	Newport County Towns.	Newport City.	Providence County Towns.	Providence City.	Washington County.	Whole State.	CAUSES OF DEATH.	Percentage in the Whole State.	Washington County.	Providence City.	Providence County Towns.	Newport City.	Newport County Towns.	Kent County.	Bristol County.
...	1	1	2	3	7	2	16	Hemorrhage	.34	.76	.34	.20	.91	.95	.34	......
...	...	...	...	.....	1	...	1	Leucocythæmia	.02	......	.05	......	......	......	......	......
2	1	...	2	.....	8	...	13	Malformation	.28	......	.39	......	.91	......	.34	.96
3	...	1	4	13	37	...	58	Marasmus	1.27	......	1.79	.90	1.80	.95	......	1.44
...	...	1	...	2	3	...	6	Purpura Hemorrhagica	.13	......	.15	.14	......	.95	......	......
3	1	...	...	3	2	2	11	Scrofula	.24	.76	.10	.20	......	......	.34	1.44
...	1	...	1	1	9	...	12	Tuberculosis	.26	......	.43	.07	.44	......	.34	......
3	3	...	...	4	7	...	17	Tumors	.37	......	.34	.27	......	......	1.01	1.44
31	24	12	31	158	184	22	462	Total	10.04	8.14	8.93	10.92	14.15	11.43	8.13	14.84
								III. NERVOUS SYSTEM.								
1	13	5	6	43	45	6	119	Apoplexy	2.58	2.23	2.19	2.99	2.76	4.76	4.41	.48
2	2	1	1	8	9	1	24	Brain, Congestion of	.52	.38	.43	.56	.45	.95	.68	.95
...	2	2	1	19	22	3	49	" Diseases of	1.05	1.02	1.08	1.32	.45	1.93	.68	......
1	2	...	6	28	49	2	88	" Inflammation of	1.92	.76	2.38	1.95	2.76	......	.68	.49
...	...	...	...	3	.....	...	3	Chorea	.07	......	......	.20	......	......	......	......
4	13	...	9	54	49	4	133	Convulsions and Fits	2.88	1.49	2.38	3.77	4.12	......	4.48	1.92
...	...	...	...	1	.....	...	1	Delirium Tremens	.02	......	......	.07	......	......	......	......

2	...	...	...	7	4	1	14	Epilepsy	.30	.38	.19	.49	......	......	......	.95
3	4	2	1	5	30	1	46	Hydrocephalus	1.01	.38	1.45	.35	.45	1.91	1.37	1.43
...	1	1	1	6	9	1	19	Insanity	.42	.38	.44	.42	.45	.95	.34	......
...	...	...	1	1	1	...	3	Meningitis, Spinal	.07	.....	.05	.07	.45	......	......	......
17	...	6	5	28	33	7	96	Paralysis	2.09	2.60	1.59	1.95	2.28	5.71	......	8.13
...	...	1	...	.....	.....	...	1	Sunstroke	.02	......	......	......	... ..	.95	......	......
...	...	1	1	.....	.....	1	3	Tetanus and Tris. Nascentium	.07	.38	......	......	.45	.95	......	......
30	37	19	32	203	251	27	599	Total	13.02	10.00	12.18	14.14	14.62	18.09	12.54	14.35
								IV. RESPIRATORY SYSTEM.								
...	1	1	1	6	2	...	11	Asthma	.23	......	.10	.41	.45	.95	.34	......
...	...	...	...	3	.....	...	3	Catarrh	.07	.....	......	.21	......	......	......	......
1	6	...	6	21	56	1	91	Bronchitis	1.98	.37	2.71	1.46	2.76	......	2.05	.48
19	45	12	22	189	322	33	642	Consumption	14.02	12.22	15.62	13.15	10.06	11.43	15.46	9.09
2	2	...	1	.....	3	1	9	Dropsy of Chest	.18	.37	.14	......	.45	.. ..	.69	.95
...	...	...	...	.....	10	...	10	Hemorrhage from Lungs	.20	......	.48	......	......	......	......	......
...	...	1	1	1	5	...	8	Laryngitis	.17	.... .	.24	.07	.45	.95	......	......
2	4	...	...	4	3	1	14	Lungs, Diseases of	.30	.37	.15	.28	......	......	1.37	.95
1	2	...	...	4	1	...	8	Pleurisy	.17	......	.05	.28	... ..	......	.69	.48
24	14	6	10	81	170	18	323	Pneumonia	7.01	6.66	8.29	5.66	4.56	5.72	4.76	11.49
2	2	1	1	11	22	2	41	" Congestion of Lungs	.89	.74	1.07	.77	.45	.95	.69	.96
51	76	21	42	320	594	56	1,160	Total	25.22	20.73	28.80	22.29	19.18	20.00	26.05	24.41
								V. CIRCULATORY SYSTEM.								
...	...	...	...	.....	2	...	2	Aneurism	.04	......	.09	......	......	......	......	......
...	...	...	1	2	1	...	4	Embolism	.08	......	.05	.14	.46	......	......	......
9	21	6	23	59	104	9	231	Heart, Diseases of	5.03	3.33	5.06	4.13	10.51	5.72	7.20	4.31
9	21	6	24	61	107	9	237	Total	5.15	3.33	5.20	4.27	10.97	5.72	7.20	4.31

TABLE X.—CLASSIFICATION AND PERCENTAGE—1880.—Continued.

Number of Deaths in each Division of the State.										Percentage of Deaths in each Division.						
Bristol County.	Kent County.	Newport County Towns.	Newport City.	Providence County Towns.	Providence City.	Washington County.	Whole State.	CAUSES OF DEATH.	Percentage in the Whole State.	Washington County.	Providence City.	Providence County Towns.	Newport City.	Newport County Towns.	Kent County.	Bristol County.
								VI. DIGESTIVE SYSTEM.								
...	...	1	2	6	1	3	13	Bowels, Diseases of	.28	1.11	.05	.42	.91	.95	......	......
...	...	...	...	2	......	...	2	Cancrum Oris	.04	......	......	.14	......	......	......	......
...	...	1	...	2	2	...	5	Colic	.11	......	.09	.14	......	.95	......	......
1	2	1	...	9	19	1	33	Enteritis	.73	.37	.94	.62	......	.95	.68	.48
...	...	1	...	2	4	1	8	Hernia	.17	.37	.19	.14	......	.95	......	......
...	...	...	...	3	......	...	3	Jaundice	.07	......	......	.21	......	......	......	......
4	3	2	6	12	25	3	55	Liver, Diseases of	1.20	1.11	1.23	.83	2.73	1.92	1.03	1.91
...	...	2	4	4	13	1	24	Peritonitis	.51	.37	.63	.28	1.82	1.92	......	......
1	4	...	1	8	10	4	28	Stomach, Diseases of	.60	1.48	.48	.55	.46	......	1.36	.48
...	...	...	...	......	3	...	3	Tabes Mesenterica	.07	......	.14	......	......	......	......	......
...	1	1	2	5	16	...	25	Teething	.55	......	.76	.35	.92	.95	.34	......
6	10	9	15	53	93	13	199	Total	4.33	4.81	4.51	3.68	6.84	8.59	3.41	2.87
								VII. URINARY SYSTEM.								
...	1	...	...	3	6	...	10	Bladder, Diseases of	.22	......	.29	.21	......	......	.34	......
2	2	...	...	5	6	...	15	Diabetes	.33	......	.29	.34	......	......	.68	.96

1	5	2	8	27	46	2	91	Kidneys, Diseases of	2.02	.74	2.24	1.88	3.64	1.92	1.71	.48
...	...	1	1	1	1	...	4	Prostate, Diseases of	.08	......	.05	.07	.46	.95	......	......
3	8	3	9	36	59	2	120	Total	2.65	.74	2.87	2.50	4.10	2.87	2.73	1.44
								VIII. GENERATIVE SYSTEM.								
4	4	2	...	8	12	3	33	Child-birth	.72	1.11	.58	.56	......	1.91	1.37	1.91
...	...	...	...	.....	3	...	3	" Puerperal Convulsions	.06	......	.14	......	......	......	......	......
...	...	1	...	1	5	...	7	Uterus, Disease of	.16	......	.26	.07	......	.95	......	......
4	4	3	...	9	20	3	43	Total	0.94	1.11	.98	.63	......	2.86	1.37	1.91
								IX. LOCOMOTIVE SYSTEM.								
...	...	...	...	.....	6	...	6	Bone, Diseases of	.13	......	.29	......	......	......	......	......
1	...	...	...	.....	1	...	2	Hip-Joint, Diseases of	.04	......	.05	......	......	......	......	.47
1	3	...	2	5	11	2	24	Rheumatism	.52	.74	.54	.34	.91	......	1.03	.47
...	1	..	...	3	4	...	8	Spine, Diseases of	.18	......	.19	.22	......	......	.34	......
2	4	...	2	8	22	2	40	Total	.87	.74	1.07	.56	.91	......	1.37	.94
								X. INTEGUMENTIVE SYSTEM.								
...	...	...	...	.....	2	...	2	Skin, Diseases of	.04	......	.09	......	......	......	......	......
...	...	...	...	.....	2	...	2	Total	.04	......	.09	......	......	......	......	......
12	20	15	19	90	73	44	273	XI. OLD AGE.	5.95	16.30	3.56	6.25	8.68	14.25	6.83	5.75
								XII. EXTERNAL CAUSES.								
1	5	3	2	13	20	2	46	Accidents (various.)	1.00	.74	.96	.90	.91	2.86	1.71	.48
...	4	...	2	4	11	...	21	" Burns and Scalds	.50	......	.54	.28	.91	......	1.37	.....

TABLE X.—CLASSIFICATION AND PERCENTAGE, 1880.—Continued.

NUMBER OF DEATHS IN EACH DIVISION OF THE STATE.										PERCENTAGE OF DEATHS IN EACH DIVISION.						
Bristol County.	Kent County.	Newport County Towns.	Newport City.	Providence County Towns.	Providence City.	Washington County.	Whole State.	CAUSES OF DEATH.	Percentage in the Whole State.	Washington County.	Providence City.	Providence County Towns.	Newport City.	Newport County Towns.	Kent County.	Bristol County.
3	4	...	1	10	13	2	33	Accidents, Drowning	.71	.74	.63	.70	.46	...	1.37	1.43
...	2	...	...	1	11	...	14	" Falls	.30	...	.54	.07	...	...	.68	...
...	...	1	...	3	1	...	5	" Poisoning	.10	...	.05	.21	...	.95	...	...
...	2	...	...	7	9	...	18	" Railroad	.40	...	.44	.49	...	...	.68	...
1	...	...	...	1	5	...	7	Exposure to cold	.15	...	.24	.07	...	...	...	.48
...	...	...	...	...	1	...	1	Heat	.02	...	.05	...	...	...	...	...
1	...	...	1	3	8	1	14	Intemperance	.30	.38	.39	.21	.46	...	...	.48
...	...	...	...	...	1	...	1	Murder	.02	...	.05	...	...	...	...	...
...	1	...	1	6	2	...	10	Suicide	.20	...	.10	.42	.46	...	.35	...
6	18	4	7	48	82	5	170	Total	3.70	1.86	3.99	3.35	3.20	3.81	6.16	2.87

TABLE XI.—OCCUPATIONS AND AGES AT DEATH, 1880.

Showing the Average Age at Death in the several Occupations, Providence City being separated from the rest of the State, and ages under twenty being excluded.

OCCUPATIONS.	WHOLE STATE.			PROVIDENCE CITY.			REST OF STATE.		
	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.
I. AGRICULTURE.									
Farmers	183	12,273	67.06	9	575	63.88	174	11,698	67.23
Gardeners	5	340	68.00	4	276	69.00	1	64	64.00
				13	851	.....	175	11,762	.....
II. PROFESSIONAL AND PERSONAL SERVICES.									
Actors	1	26	26.00				1	26	26.00
Artists	1	42	42.00	1	42	42.00	...	......	.....
Barbers.............	6	211	35.17	4	113	28.25	2	98	49.00
Civil Engineers	2	125	62.50	...	......	. ...	2	125	62.50
Clergymen	6	425	70.83	1	66	66.00	5	359	71.80
Clerks and Salesmen.	34	1,065	31.32	28	846	30.21	6	219	36.50
Coachmen	3	143	47.66	3	143	47.66	...	......	.....
Collectors.	1	82	82.00	1	82	82.00	...	......	.....
Cooks	2	130	65.00	2	130	65.00	...	.. ..	.....
Dentists	1	23	23.00	1	23	23.00	...	......	.....
Firemen	3	127	42.33	3	127	42.33	...	......	.....
Editors	1	59	59.00	...	.....	.....	1	59	59.00
Hotel-keepers	6	311	51.83	2	99	49.50	4	212	53.00
Laborers...........	219	10,198	46.53	116	5,086	43.84	103	5,112	49.60
Lawyers	6	451	75.17	...	.....	. ...	6	451	75.17
Musicians	1	46	46.00	1	46	46.00	...	......	.....
Music-teachers	1	71	71.00	...	.....	. ...	1	71	71.00
Photographers.	2	73	36.50	2	73	36.50	...	......	.....
Physicians	7	396	56.57	1	62	62.00	6	334	55.66
Policemen..........	1	40	40.00	...	.....	.....	1	40	40.00
Reporters	1	34	34.00	1	34	34.00	...	......	.....
Saloon-keepers	9	349	38.77	6	224	37.33	3	125	41.66
Students	8	172	21.50	3	64	21.33	6	108	18.00
Teachers	3	124	41.33	2	103	51.50	1	21	21.00
Waiters	2	52	26.00	1	30	30.00	1	22	22.00
Watchmen	2	112	56.00	2	112	56.00	...	......	. ...
	518	27,500	.....	181	7,505	....	149	7,382	.....
III. TRADE AND TRANSPORTATION.									
Agents	8	422	52.75	5	253	50.60	3	169	56.33

TABLE XI.—OCCUPATIONS, 1880.—Continued.

OCCUPATIONS.	WHOLE STATE.			PROVIDENCE CITY.			REST OF STATE.		
	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.
Apothecaries	1	75	75.00	1	75	75.00	...	......	....
Bankers	1	54	54.00	1	54	54.00	...	......	.....
Book-keepers	7	295	42.14	6	263	43.83	1	32	32.00
Boatmen	1	28	28.00	...	.....	....	1	28	28.00
Brokers	2	94	47.00	1	64	64.00	1	30	30.00
Butchers	4	189	47.25	1	39	39.00	3	150	50.00
Cashiers (Bank, &c.)	3	241	80.33	2	162	81.00	1	79	79.00
Confectioners	1	79	79.00	...	.....	.....	1	79	79.00
Conductors	1	37	37.00	1	37	37.00	...	......	.....
Expressmen	1	27	27.00	...	.....	....	1	27	27.00
Fishermen and Oystermen	5	255	51.00	...	.....	.....	5	255	51.00
Grocers	8	363	45.38	4	198	49.50	4	165	41.25
Government Inspectors	2	114	57.00	2	114	57.00	3	122	40.66
Hackmen	3	122	40.66	...	.....	.....	...	......	.....
Liquor Dealers	4	144	36.00	4	144	38.00	...	......	.....
Mariners	6	246	41.00	5	210	42.00	1	36	36.00
Marketmen	2	145	72.50	2	145	72.50	...	......	.....
Merchants	21	1,298	61.81	17	1,072	63.06	4	226	56.50
Peddlers	11	509	46.30	5	176	35.20	6	333	55.50
Pilots	1	44	44.00	1	44	44.00	...	......	.....
R. R. Station Agents	2	94	47.00	...	.....	.....	2	94	47.00
Sea Captains	12	822	68.50	5	304	60.80	7	518	75.45
Seamen, Ord	9	505	.....	4	272	68.00	5	233	46.60
Teamsters	11	424	38.55	8	312	39.00	3	112	37.33
Treasurers	1	81	81.00	1	81	.....	...	.....	.....
Tobacconists	2	129	64.50	2	129	63.00	...	......	.....
Traders and Dealers.	6	328	54.66	1	42	42.00	5	286	57.20
	136	7,164	.....	79	4,190	.....	57	2,974	.....
IV. MANUFACTURES, MECHANICAL AND MINING INDUSTRIES.									
Bakers	3	144	48.00	2	124	62.00	1	20	20.00
Belt-makers	2	127	63.50	2	127	63.50	...	......	.....
Blacksmiths	14	806	57.57	3	162	53.33	11	644	58.55
Block-makers	1	52	52.00	1	52	52.00	...	......	.....
Boat-builders	2	132	66.00	...	.....	.....	2	132	66.00
Boiler-makers	2	104	52.00	...	.....	.....	2	104	52.00
Book-binders	5	140	28.00	5	140	28.00	...	......	.....
Boot and Shoe-makers	6	368	61.33	...	.....	.....	6	368	61.33
Brass Founders	3	221	73.66	3	221	73.66	...	......	.....

TABLE XI.—OCCUPATIONS, 1880.—Continued.

OCCUPATIONS.	WHOLE STATE.			PROVIDENCE CITY.			REST OF STATE.		
	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.
Brewers	1	70	70.00	1	70	70.00	...	.....	.....
Brush-makers	1	74	74.00	...	.....	.....	1	73	74.00
Builders and Contractors	2	112	56.00	2	112	56.00	...	.....	.....
Cabinet-makers	6	400	66.66	3	199	66.33	3	201	67.00
Carpenters	43	2,390	55.58	20	1,018	50.90	23	1,372	59.65
Carriage-makers	1	39	39.00	...	.....	.....	1	39	39.00
Cigar-makers	3	144	48.00	2	88	44.00	1	56	56.00
Coopers	3	170	56.66	3	170	56.66	...	.....	.....
Die Sinkers	1	58	58.00	1	58	58.00	...	.....	.....
Dyers	6	225	37.50	4	173	43.25	2	52	26.00
Engineers	6	290	48.33	6	290	48.33	...	.....	.....
Engravers	2	98	49.50	2	98	49.00	...	.....	.....
File Cutters	3	238	79.33	3	238	79.33	...	.....	.....
Harness-makers	4	162	40.50	3	112	37.33	1	50	50.00
Hatters	2	61	30.50	...	.....	.....	2	61	30.50
House Movers	1	80	80.00	...	.....	.....	1	80	80.00
Inventors	1	48	48.00	1	48	48.00	...	.....	....
Jewelers	21	831	39.57	16	611	38.13	5	220	44.00
Machinists	36	1,737	48.28	18	848	47.11	18	889	49.22
Manufacturers	15	941	62.74	10	625	62.50	5	316	63.20
Masons	19	1,036	54.53	14	753	53.71	5	283	56.60
Mechanics	14	825	58.93	7	334	47.51	7	491	70.14
Millwrights	1	73	73.00	...	.....	....	1	73	73.00
Moulders	6	244	40.66	6	244	40.66	...	.....	.....
Operatives	66	2,259	34.23	18	536	29.77	48	1,723	35.89
Overseers and Superintendents	4	234	58.50	3	168	56.00	1	66	66.00
Painters	27	1,292	47.84	16	765	47.66	11	527	47.91
Pattern-makers	3	229	76.33	2	144	72.00	1	85	85.00
Piano Makers	1	42	42.00	1	42	42.00	...	.....	.....
Plumbers	3	121	40.33	1	20	20.00	2	101	50.50
Printers	8	349	43.62	4	167	41.75	4	182	45.50
Ship Carpenters	4	273	68.25	1	76	76.00	3	197	65.66
Silversmiths	2	107	53.50	2	107	53.50	...	.....	.....
Stone Cutters	6	393	65.50	3	186	62.00	3	207	69.00
Tailors	10	567	56.70	6	336	56.00	4	231	57.75
Tinsmiths	5	202	40.40	3	76	25.33	2	126	63.00
Upholsterers	3	89	29.66	2	64	32.00	1	25	25.00
Wheelwrights	3	167	55.66	...	.....	....	3	167	55.66
	381	18,068	.....	200	9,602	.....	181	9,162	.....
V. FEMALES.									
Boarding-housekeepers	11	671	61.00	11	671	61.00	...	.....	.....

TABLE XI.—OCCUPATIONS, 1880.—Concluded.

OCCUPATIONS.	WHOLE STATE.			PROVIDENCE CITY.			REST OF STATE.		
	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.
Dressmakers and Seamstresses	11	374	34.00	7	230	32.86	4	144	36.00
Housekeepers	312	18,376	58.09	2	97	48.50	310	18,279	59.00
Operatives	10	320	32.00	5	188	37.60	5	132	26.40
Servants	14	537	38.36	14	537	38.36	...	....	.....
Tailoresses	4	209	52.25	2	51	25.50	2	158	79.00
Teachers	2	106	53.00	1	31	31.00	1	75	75.00
	364	20,593	.....	42	1,805	.....	322	18,788	.....

TABLE XI.—RECAPITULATION BY CLASSES.

OCCUPATIONS.	WHOLE STATE.			PROVIDENCE CITY.			REST OF STATE.		
	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.	Number who Died.	Aggregate Age.	Average Age.
I. AGRICULTURE	188	12,613	67.09	13	851	65.46	175	11,762	67.20
II. PROFESSIONAL AND PERSONAL SERVICES...	518	27,500	53.09	181	7,505	41.46	149	7,382	49.54
III. TRADE AND TRANSPORTATION..	136	7,164	52.68	79	4,190	53.04	57	2,974	52.18
IV. MANUFACTURES, MECHANICAL AND MINING INDUSTRIES.	381	18,068	47.42	200	9,602	48.01	181	9,162	50.62
V. FEMALES..	364	20,593	56.57	42	1,805	42.97	322	18,788	58.32
ALL CLASSES.	1,587	83,938	53.00	515	23,594	45.81	884	50,068	56.63

Table XII.—OCCUPATIONS AND CAUSES OF DEATH, 1880.

Deaths at ages under twenty years being excluded.

OCCUPATIONS.	Number of given causes.	Abcess.	Accidents.	Aneurism.	Apoplexy and Paralysis.	Asthma.	Bladder, Diseases of.	Brain, Diseases of.	Bronchitis.	Cancer.	Cholera Morbus.	Colic.	Consumption.	Debility.	Diabetes.	Diarrhœa.	Diphtheria.	Dropsy.	Dysentery.	Enteritis.	Epilepsy.	Erysipelas.	Fevers.	Gangrene.	Heart, Diseases of.	Hemorrhage.	Hernia.	Insanity.	Intemperance.	Kidneys, Disease of.	Liver, Diseases of.	Lungs, Acute Diseases of.	Meningitis Cerebro Spinal.	Marasmus.	Obstruction of the Bowels.	Old Age.	Peritonitis.	Pleurisy.	Pyemia.	Rheumatism.	Stomach, Diseases of.	Syphilis.	Tetanus.	Tuberculosis.	Tumor.	Exposure.	Bone, Disease of.
I. AGRICULTURE.																																														
Farmers	171	..	2	..	23	..	5	4	2	4	..	1	17	1	..	1	2	4	1	3	1	2	4	2	16	..	1	..	..	2	6	14	..	..	..	51	..	..	..	..	1	..	..	..	1	1	1
Florists	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gardeners	5	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	2	..	1	..	1	..	..	..	..	..	..	..
	176	..	2	..	23	..	5	4	2	4	..	1	17	1	..	1	2	4	1	3	1	2	4	2	17	..	1	..	..	2	6	14	..	..	..	53	1	1	..	1	1	..	..	..	1	1	1
II. PROFESSIONAL AND PERSONAL SERVICES.																																														
Actors	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Artists	3	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Auctioneers	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Authors	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Barbers	6	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Canvassers	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Civil Engineers	2	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Clergymen	7	..	..	..	1	..	..	..	..	1	..	..	....	..	..	..	..	..	..	..	..	..	1	..	1	..	..	2	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Clerks and Salesmen	37	..	..	..	1	..	..	1	..	..	..	..	18	..	..	..	1	..	..	..	1	..	1	..	5	..	..	..	..	3	1	2	..	..	..	..	..	..	..	1	2	..	..	..	..	..	..
Coachmen	7	..	1	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Collectors	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Constables	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cooks	3	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Dentist	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Editor	1	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hotel-Keepers	6	..	..	..	..	..	1	1	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	2	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Janitors	..	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Journalists	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Laborers	222	1	25	..	8	..	3	2	8	5	1	1	62	3	1	1	..	2	..	3	3	1	10	..	20	4	2	1	1	5	2	22	..	1	..	18	2	..	..	1	1	1	..	..	1	..	..

TABLE XII.—OCCUPATIONS AND CAUSES OF DEATH, 1880.—Continued.

OCCUPATIONS.	Number of given causes.	Abscess.	Accidents.	Aneurism.	Apoplexy and Paralysis.	Asthma.	Bladder, Diseases of.	Brain, Diseases of.	Bronchitis.	Cancer.	Cholera Morbus.	Colic.	Consumption.	Debility.	Diabetes.	Diarrhœa.	Diphtheria.	Dropsy.	Dysentery.	Enteritis.	Epilepsy.	Erysipelas.	Fevers.	Gangrene.	Heart, Diseases of.	Hemorrhage.	Hernia.	Insanity.	Intemperance.	Kidneys, Disease of.	Liver, Diseases of.	Lungs, Acute Diseases of.	Meningitis Cerebro Spinal.	Marasmus.	Obstruction of the Bowels.	Old Age.	Peritonitis.	Pleurisy.	Pyemia.	Rheumatism.	Stomach, Diseases of.	Syphilis.	Tetanus.	Tuberculosis.	Tumor.	Exposure.	Bone, Disease of.
Laundrymen, (Chinese)	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lawyers	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Letter Carriers	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Musicians	2	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Music-Teachers	...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nurses	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Photographers	2	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Physicians	7	..	..	..	2	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Policemen	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Reporter	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Saloon-Keepers	9	..	..	..	..	..	..	..	..	1	..	..	4	..	..	..	..	1	..	..	..	..	2	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Stable-Keepers	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Students	8	..	1	..	..	..	..	2	..	..	..	1	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Teachers	8	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	1	..	2	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Undertakers	.. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Waiters	2	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Watchmen	3	..	..	..	..	..	..	..	..	2	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Contractor	1	..	..	..	..	..	..	..	..	..	..	..	...	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
	344	1	28	..	13	..	4	7	9	9	1	2	104	3	2	1	2	3	..	3	4	1	16	..	34	4	2	4	1	13	5	33	..	1	..	21	2	..	..	1	3	1	..	1	1	1	..
III. TRADE AND TRANSPORTATION.																																															
Agents	11	..	..	..	..	..	..	..	..	2	..	..	1	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	2	1	2	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
" Insurance	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Apothecaries	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Bankers	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Bakers	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Book-keepers	7	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	2	..	..	1	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Boatmen	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

OCCUPATIONS.	Number of given causes.	Abcess.	Accident.	Aneurism.	Apoplexy and Paralysis.	Asthma.	Bladder, Diseases of.	Brain, Diseases of.	Bronchitis.	Cancer.	Cholera Morbus.	Colic.	Consumption.	Debility.	Diabetes.	Diarrhœa.	Diphtheria.	Dropsy.	Dysentery.
Brakemen	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Brokers	2	..	..	..	1	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Butchers	5	..	1	..	1	..	..	..	..	..	..	..	3	..	..	..	..	..	..
Car Drivers	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Cashiers (Bank, &c.)	5	..	..	..	1	..	..	1	..	..	..	..	1	..	..	..	..	..	..
Collectors	1	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Confectioners	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Conductors	1	..	1	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Expressmen	2	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Fishermen and Oystermen	8	1	..	..	..	..	..	2	..	1	..	..	1	..	..	..	..	2	..
Grocers	9	..	..	..	1	..	1	..	..	..	..	..	2	..	..	..	..	..	..
Hackmen	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Liquor Dealers	5	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	1
Mariners	11	..	3	..	1	..	..	..	..	..	..	..	....	..	..	..	..	1	..
Marketmen	3	..	..	..	1	..	..	..	..	1	..	..	....	..	..	..	..	1	..
Merchants	24	..	2	..	5	..	..	..	2	2	..	..	1	1	..	..	..	..	..
Milkmen	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Peddlers	5	..	..	..	1	..	..	..	1	..	..	..	....	..	..	..	..	..	..
Pilots	2	..	..	..	..	..	..	..	..	1	..	..	....	..	..	..	..	..	..
Porters	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
R. R. Station Agent	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Sea Captains	8	..	1	..	5	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Seamen, Ord.	14	..	2	1	1	..	..	..	..	..	..	..	1	1	..	..	..	..	..
Ship Chandlers	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Stevedores	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Teamsters	11	1	..	..	..	..	..	..	..	..	..	1	4	..	..	..	1	..	..
Telegraphers	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..
Tobacconists	3	..	..	..	1	..	1	..	..	1	..	..	....	..	..	..	..	..	..
Traders and Dealers	13	..	..	..	..	..	..	..	..	2	..	..	3	..	..	..	..	1	..
	153	2	10	1	19	..	1	3	4	10	..	1	21	3	..	..	1	6	1

OCCUPATIONS.	Enteritis.	Epilepsy.	Erysipelas.	Fevers.	Gangrene.	Heart, Diseases of.	Hemorrhage.	Hernia.	Insanity.	Intemperance.	Kidneys, Disease of.	Liver, Diseases of.	Lungs, Acute Diseases of.	Meningitis, Cerebro Spinal.	Marasmus.	Obstruction of the Bowels.	Old Age.	Peritonitis.	Pleurisy.	Pyemia.	Rheumatism.	Stomach, Diseases of.	Syphilis.	Tetanus.	Tuberculosis.	Tumor.	Exposure.	Bone, Disease of.
Brakemen	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Brokers	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Butchers	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Car Drivers	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cashiers (Bank, &c.)	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Collectors	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Confectioners	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Conductors	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Expressmen	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Fishermen and Oystermen	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Grocers	..	..	..	1	..	1	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hackmen	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Liquor Dealers	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mariners	..	..	..	..	..	..	..	..	..	1	..	..	3	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..
Marketmen	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Merchants	..	..	..	..	..	6	..	..	1	..	3	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Milkmen	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Peddlers	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Pilots	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Porters	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
R. R. Station Agent	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sea Captains	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Seamen, Ord.	..	..	..	3	..	..	..	..	..	..	2	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..
Ship Chandlers	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Stevedores	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Teamsters	..	..	..	1	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Telegraphers	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tobacconists	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Traders and Dealers	..	..	..	..	..	1	..	..	..	..	..	2	2	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
	1	..	2	6	..	11	..	1	2	1	11	4	18	1	1	..	9	..	..	..	..	1	..	..	..	..	..	..

Table XII.—OCCUPATIONS AND CAUSES OF DEATH, 1880.—Continued.

OCCUPATIONS.	Number of given causes.	Abcess.	Accident.	Aneurism.	Apoplexy and Paralysis.	Asthma.	Bladder, Diseases of.	Brain, Diseases of.	Bronchitis.	Cancer.	Cholera Morbus.	Colic.	Consumption.	Debility.	Diabetes.	Diarrhœa.	Diphtheria.	Dropsy.	Dysentery.	Enteritis.	Epilepsy.	Erysipelas.	Fevers.	Gangrene.	Heart, Diseases of.	Hemorrhage.	Hernia.	Insanity.	Intemperance.	Kidneys, Disease of.	Liver, Diseases of.	Lungs, Acute Diseases of.	Meningitis, Cerebro Spinal.	Marasmus.	Obstruction of the Bowels.	Old Age.	Peritonitis.	Pleurisy.	Pyemia.	Rheumatism.	Stomach, Diseases of.	Syphilis.	Tetanus.	Tuberculosis.	Tumor.	Exposure.	Bone, Disease of.
IV. Manufactures, mechanical and Mining Industries.																																															
Bakers	2												1																							1											
Belt Makers	2							1					1																																		
Blacksmiths	16		1		2				1	1			5	2									1							1		1	1														
Bleachers																																															
Block Maker	1																													1																	
Boat-builders																																															
Boiler Makers	6							1					3												1							1															
Book-binders																																															
Boot and Shoe Makers	10		1		3		1						1											1						1						1								1			
Brewers																																															
Brush Makers																																															
Cabinet Makers	5												1												1					1	1					1											
Calico Printers																																															
Carpenters	47		3		4	1	2	1		1			7	2		1							4		4						1	5			1	5				2	1			2			
Carriage Makers																																															
Cigar Makers	3									1			2																																		
Confectioners	1																													1																	
Coopers	4																			1			1									1				1											
Coppersmiths																																															
Curriers and Tanners																																															
Designers																																															
Die Sinkers	1		1																																												
Distillers																																															
Dyers	6				1								1						1				1		1																			1			
Engineers	9		2		3								2					1												1																	
Engravers	2												1																			1															
Farriers																																															
File Cutters	3				1								1																			1															

OCCUPATIONS.	Number of given causes.	Abcess.	Accident.	Aneurism.	Apoplexy and Paralysis.	Asthma.	Bladder, Diseases of.	Brain, Diseases of.	Bronchitis.	Cancer.	Cholera Morbus.	Colic.	Consumption.	Debility.	Diabetes.	Diarrhœa.	Diphtheria.	Dropsy.	Dysentery.	Enteritis.	Epilepsy.	Erysipelas.	Fevers.	Gangrene.	Heart, Diseases of.	Hemorrhage.	Hernia.	Insanity.	Intemperance.	Kidneys, Disease of.	Liver, Diseases of.	Lungs, Acute Diseases of.	Meningitis, Cerebro Spinal.	Marasmus.	Obstruction of the Bowels.	Old Age.	Peritonitis.	Pleurisy.	Pyemia.	Rheumatism.	Stomach, Diseases of.	Syphilis.	Tetanus.	Tuberculosis.	Tumor.	Exposure.	Bone, Disease of.
Gas Fitters	...																																														
Glaziers	...																																														
Gunsmith	1																								1																						
Harness Makers	7		1										2					1					2						1																		
Hatter	1				1																																										
House Mover	...																																														
Icemen	...																																														
Iron Worker	1												1																																		
Jewelers	22		1		2				1				12										2		1				1			1		1													
Machinists	27		1		4					3			4	1	1			1	1						2	1						4				1		1		1					1		
Manufacturers	11				2					1															2					1		3						1			1						
Masons	21				2		3			3			3						1	1					1			1			1	4				1											
Mechanics	11				1			1					2												3					3		1															
Millers	...																																														
Millwright	...																																														
Miners	...																																														
Moulders	11	1											4									1	2		2							1															
Operatives	60	1	6		2			1		3			26				2	1	1				2		2	1				2	2	6				1									1		
Overseers and Superintendents	4				1					1															1													1									
Painters	27		2		5					1			3	1			1	2					1	1	3					1	1	3						1			1						
Pattern Makers	3				1								1																			1															
Paper Hangers	...																																														
Piano Maker	1				1																																										
Plumbers	4												1										1							1					1												
Printers	7							1		1			1	1											1						1									1							
Riggers	...																																														
Roll Coverer	...																																														
Rope Makers	...																																														
Rubber Workers	3																															3															
Sail Makers	...																																														
Ship Carpenters	3				1																											2															

TABLE XII.—OCCUPATIONS AND CAUSES OF DEATH, 1880.—Continued.

OCCUPATIONS.	Number of given causes.	Abscess.	Accidents.	Aneurism.	Apoplexy and Paralysis.	Asthma.	Bladder, Diseases of.	Brain, Diseases of.	Bronchitis.	Cancer.	Cholera Morbus.	Colic.	Consumption.	Debility.	Diabetes.	Diarrhœa.	Diphtheria.	Dropsy.	Dysentery.	Enteritis.	Epilepsy.	Erysipelas.	Fevers.	Gangrene.	Heart, Diseases of.	Hemorrhage.	Hernia.	Insanity.	Intemperance.	Kidneys, Disease of.	Liver, Diseases of.	Lungs, Acute Diseases of.	Meningitis Cerebro Spinal.	Marasmus.	Obstruction of the Bowels.	Old Age.	Peritonitis.	Pleurisy.	Pyemia.	Rheumatism.	Stomach, Diseases of.	Syphilis.	Tetanus.	Tuberculosis.	Tumor.	Exposure.	Bone, Disease of.
Silversmiths	2	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Stair Builder	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Stone Cutters	6	..	1	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Stucco Workers	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tailors	10	..	..	..	..	..	1	1	..	..	..	..	3	..	..	..	..	..	..	1	..	..	..	..	3	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tinsmiths	5	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tool Makers	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Umbrella Makers	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Upholsterers	3	..	1	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Watch Makers	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wheelwrights	4	..	..	..	1	..	..	..	..	..	..	..	....	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wire Workers	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	373	..	21	..	38	4	7	5	1	17	..	..	94	7	1	1	3	7	4	3	..	2	18	2	31	2	..	..	3	16	7	42	1	1	2	12	..	4	..	4	4	..	..	4	2	..	..
V. FEMALES.																																															
Actress	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
House Keepers	323	..	5	..	20	..	..	10	3	14	2	..	73	12	2	2	..	9	..	1	1	..	13	2	32	5	1	3	..	9	13	13	1	..	..	56	7	2	1	3	7	..	..	..	1	..	..
Book Binders	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dressmakers and Seamstresses	11	..	..	..	1	..	..	1	..	2	..	..	5	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Milliners	2	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nurses	1	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Operatives	4	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Servants	14	..	..	..	..	..	..	..	..	..	1	..	6	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	2	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Sisters of Mercy	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tailoresses	4	..	..	..	2	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Teachers	....	..	..	..	..	..	..	..	..	..	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	359	..	5	..	23	..	..	11	3	16	3	..	89	12	2	2	..	9	..	1	1	..	19	2	33	5	1	3	..	10	13	16	1	..	..	57	8	2	1	3	7	..	..	..	1	..	..

Table XII.—RECAPITULATION BY CLASSES.

OCCUPATIONS.	Whole Number of given causes.	Abcess.	Accidents.	Aneurism.	Apoplexy and Paralysis.	Asthma.	Bladder, Diseases of.	Brain, Diseases of.	Bronchitis.	Cancer.	Cholera Morbus.	Colic.	Consumption.	Debility.	Diabetes.	Diarrhœa.	Diphtheria.	Dropsy.	Dysentery.	Enteritis.	Epilepsy.	Erysipelas.	Fevers.	Gangrene.	Heart, Diseases of.	Hemorrhage.	Hernia.	Insanity.	Intemperance.	Kidneys, Disease of.	Liver, Diseases of.	Lungs, Acute Diseases of.	Meningitis Cerebro Spinal.	Marasmus.	Obstruction of the Bowels.	Old Age.	Peritonitis.	Pleurisy.	Pyemia.	Rheumatism.	Stomach, Diseases of.	Syphilis.	Tetanus.	Tuberculosis.	Tumor.	Exposure.	Bone, Disease of.
I. Agriculture	176	..	2	..	23	..	5	4	2	4	..	1	17	1	..	1	2	4	1	3	1	2	4	2	17	..	1	..	..	2	6	14	..	..	..	53	1	1	..	1	1	..	..	..	1	1	1
II. Professional and Personal Services	344	..	28	..	13	..	4	7	9	9	1	2	107	3	2	1	2	3	..	3	4	1	16	..	34	4	2	4	1	13	5	33	..	1	..	21	2	..	..	1	3	1	..	1	1	..	..
III. Trade and Transportation	153	2	10	1	19	..	1	3	4	10	..	1	21	3	..	..	1	6	1	1	..	2	6	..	11	..	1	2	1	11	4	18	..	1	1	9	..	..	..	..	1	..	..	..	..	..	..
IV. Manufactures, Mechanical and Mining Industries	373	2	21	..	38	4	7	5	1	17	..	..	94	7	1	1	3	7	4	3	..	2	18	2	31	2	..	..	3	16	7	42	1	1	2	12	..	4	..	4	4	..	..	4	2	..	..
V. Females	359	..	5	..	23	..	..	11	3	16	3	..	89	12	2	2	..	9	..	1	..	1	19	2	33	5	1	3	..	10	13	16	1	..	..	57	8	2	1	3	7	..	..	..	1	..	..
All Classes	1,405	4	66	1	116	4	17	30	19	56	4	4	328	26	5	5	8	29	6	11	5	8	63	6	126	11	5	9	5	52	35	123	2	3	3	152	11	7	1	9	16	1	..	5	5	1	1

Of diseases not stated above, there were the following in addition:

In Class I., there were three Farmers who committed suicide, and one died from Scarlatina.

In Class II., one Laborer died from Suicide, and one from enlarged Prostate, one Physician died of Scarlatina.

In Class III., one Fisherman died of Scarlatina, one Operative of diseased Prostate, and one Trader committed suicide.

In Class V., one Housekeeper committed suicide.

RESULTS AND OBSERVATIONS, 1880.

The whole number of births recorded in the state of Rhode Island during the year 1880, was six thousand two hundred and ninety-five (6,295); the whole number of marriages two thousand seven hundred and sixty-nine (2,769); and the whole number of deaths four thousand eight hundred and twenty-nine (4,829).

TABLE XIII.

Presenting the general results of Registration in the State, during each of the last twenty-seven years.

Year.	Whole Number of Births.	Still-born.	Living Births.	Marriages.	Deaths.
1854	2,105	78	2,027	1,047	1,720
1855	2,926	124	2,802	1,375	1,846
1856	2,906	183	2,723	1,535	2,042
1857	4,026	185	3,841	1,526	2.325
1858	4,263	177	4,086	1.438	2,616
1859	4,500	177	4,323	1,672	2,270
1860	4,660	167	4,493	1.748	2,686
1861	4,840	146	4,694	1,533	2,927
1862	4,125	123	4.002	1,450	2,591
1863	3,691	111	3,580	1,618	3,207
1864	3,892	138	3,754	1,844	3,360
1865	3,955	177	3,778	1,896	3,405
1866	4,902	172	4,730	2,318	2,970
1867	5,127	163	4,964	2,341	2,889
1868	5,372	212	5,160	2,285	2.912
1869	5,245	220	5,025	2,289	3,382
1870	5,215	234	4,981	2,362	3.238
1871	5,678	223	5,455	2,336	3,344
1872	6,143	202	5,941	2,537	4.247
1873	6,022	228	5,794	2,630	4,403
1874	6,466	277	6,189	2,541	4,229
1875	6,508	246	6,262	2,485	4,317
1876	6,329	224	6,105	2,253	4,116
1877	6,235	242	5,993	2,282	4,450
1878	6,714	248	6,466	2,324	4,441
1879	6,350	216	6.134	2,396	4,472
1880	6,295	192	6,103	2,769	4,829

The aggregates for the whole period of 27 years are, of recorded births, 128,140, of whom 4,869 were still-born, and 123,271 were living children.

Of marriages recorded there were 52,431, or 104,862 persons married; and of recorded deaths, 84,762 persons.

On the next page the usual Table is given, showing a comparison of the births, marriages and deaths, with the population, in each town in the State, for the year 1880.

TABLE XIV.

BIRTHS, MARRIAGES AND DEATHS IN RHODE ISLAND, IN 1880, COMPARED WITH THE POPULATION BY THE CENSUS OF 1880.

TOWNS AND DIVISIONS OF THE STATE.	Population in 1880.	Births in 1880.	To population one birth in.	Marriages in 1880.	To population one person married in.	Deaths in 1880.	Of population one death in.	Deaths in each 100 of the population.
Barrington	1,359	17	80.00	12	56.60	21	64.71	1.54
Bristol	6,028	181	33.30	30	100.46	121	49.82	2.01
Warren	4,007	80	50.01	55	36.36	77	52.07	1.92
BRISTOL COUNTY	11,394	278	40.00	97	58.73	219	52.01	1.92
Coventry	4,519	67	67.31	45	50.21	61	74.08	1.35
East Greenwich	2,887	53	54.35	43	33.49	53	54.47	1.84
West Greenwich	1,018	23	44.26	8	63.62	23	44.26	2.26
Warwick	12,164	297	40.96	121	50.26	169	71.98	1.39
KENT COUNTY	20,588	440	46.79	217	47.42	306	67.28	1.49
Jamestown	459	5	91.80	2	114.75	2	229.50	.44
Little Compton	1,202	14	85.86	3	200.33	15	80.13	1.25
Middletown	1,139	29	39.28	6	94.92	16	71.19	1.40
New Shoreham	1,203	10	120.40	13	46.27	6	200.50	.49
Portsmouth	1,979	32	61.84	11	89.95	26	76.12	1.31
Tiverton	2,505	50	50.10	36	34.79	42	59.52	1.68
TOWNS, NEWPORT COUNTY	8,487	140	60.62	71	59.77	107	79.32	1.26
NEWPORT CITY	15,693	399	39.32	123	64.20	243	64.58	1.54
Burrillville	5,714	125	45.71	42	68.02	105	54.42	1.84
Cranston	5,940	120	49.50	22	135.00	146	40.68	2.46
Cumberland	6,445	143	45.07	56	57.55	107	60.23	1.66
East Providence	5,056	124	40.77	40	63.20	77	65.58	1.52
Foster	1,552	22	70.54	26	29.85	21	73.90	1.37
Glocester	2,250	46	48.91	19	59.21	42	53.57	1.80
Johnston	5,765	146	39.49	22	131.02	81	71.17	1.40
Lincoln	13,765	299	46.04	90	76.47	188	73.22	1.37
North Providence	1,467	29	50 54	......	......	16	91.25	1.09
North Smithfield	3,088	21	147.00	27	57.19	45	68.62	1.45
Pawtucket	19,030	404	47.10	204	46.64	351	54.21	1.84
Scituate	3,810	78	48.85	31	61.47	58	65.69	1.52
Smithfield	3,085	56	55.69	18	85.69	33	90.45	1.07
Woonsocket	16,050	371	43.26	187	42.91	318	50.47	1.98
TOWNS, PROVIDENCE COUNTY	93,017	1,984	46 88	784	59.32	1,588	58.57	1.70
PROVIDENCE CITY	104,857	2,626	39.92	1,231	42.59	2,080	54.12	1.98
Charlestown	1,117	13	85.92	13	42.96	15	74.47	1.34
Exeter	1,310	30	43.67	14	46.79	20	65.50	1.52
Hopkinton	2,952	62	47.61	60	24.60	34	86.82	1.12
North Kingstown	3,949	90	43.88	35	56.41	67	58.44	1.70
South Kingstown	5,114	88	58.11	36	70.03	40	128.00	.78
Richmond	1,949	41	47.29	3	324.83	33	59.06	1.70
Westerly	6,104	104	58.69	85	35.91	77	79.27	1.26
WASHINGTON COUNTY	22,495	428	52.56	246	45.72	286	85.65	1.27
WHOLE STATE	276,531	6,295	43.93	2,769	49.93	4,829	57.26	1.75

In Table XIII will be found the general results of registration in the whole State, during each of the last twenty-seven years.

It will be observed that the number of births, marriages and deaths do not occur with any regularity from year to year, but that the opposite is the rule. At the same time there is a gradually increasing number of each of the classes of events, taking periods of five years together, corresponding in some degree with the increase of population.

A comparison of the results of registration during the year 1880, with the previous year, will show that of the whole number of births, there were fifty-five *less* than during 1879, and of living births, thirty-one less. There were in the whole number of births during 1880, four hundred and nineteen less than during the year 1878, and with one exception less than in any year since 1873. With an increase of population during these years of between twenty and twenty-five thousand, there must have been causes outside of natural causes, to have so largely lessened the ratio of births to population.

The number of marriages during 1880 was three hundred and seventy-three *larger* than during the previous year, and larger by one hundred and thirty-nine than in any other year during the whole period of registration.

Of deaths, there were recorded three hundred and fifty-seven *more* than during the previous year, the number being the largest ever recorded in any one year.

Table XIV presents the general results of registration in all of the towns in Rhode Island during the year 1880, together with the proportion of the several events of births, marriages and deaths to the population of each of the towns, by the census of the same year.

It is curious to note the great variableness of these proportions. In regard to births, the largest proportion to population occurring during 1880, was in the town of Bristol, that is, one birth in every 33.30 of the inhabitants, or about three and one-third per cent.; while in the town of North Smithfield, there was but one in every 147.00 persons, or about two-thirds of one per cent.

During the two preceding years, the town of East Providence reported the highest birth-rate: in 1879, one in every 30.09 and in 1878, the extraordinary proportion of one in every 26.12 persons.

Following Bristol in the order of highest birth-rate, are Middletown, one in every 39.28; Newport city, one in 39.32; Johnston, one in 39.49, and Providence city, one in every 39.92 persons.

On the other hand, following North Smithfield in exceptionally low birth-rates, are New Shoreham, one in every 120.40 persons; Jamestown, one in every 91.80; Charlestown, one in 85.92, and Little Compton, one in every 85.86 persons. The birth-rate in North

Smithfield during the year 1880, presents a strong contrast with that of 1879, when the birth rate was one in every 36.33 persons resident, or a proportion more than four times as large. For a period of ten years previous, the average proportion in that town was one in every 47 persons, and the low ratio of 1880 suggests defective registration.

In the counties, the proportions of the aggregate births to the aggregate population were as follows:

In Bristol County, one in every 40.00 persons; in Kent County, one in every 46.79; in Newport County, one in 44.86; Providence County, one in 42.92, and Washington County, one in every 52.56 persons.

For the whole State, the proportion was one birth in every 43.93 of the resident population.

The ratio of the number of persons married to population, is in every year more variable in the different towns than that of either births or deaths. The largest proportion to population of persons married in 1880, was, not according to the established rule, in the town of Foster, but in the town of Hopkinton, which recorded the large ratio of one person married in every 24.60 persons; the town of Foster following closely with a proportion of one person married in every 29.63 persons.

In these towns, a considerable number of the marriages have been of parties coming from another State, because of the greater facilities heretofore afforded in the accomplishment of the object.

The working of the new marriage law will doubtless lessen considerably the number of marriages in several of the border towns of the State.

There were no marriages recorded in the town of North Providence during the year 1880, a circumstance which will probably never again occur. Next to North Providence without a marriage record for the year, the town of Richmond follows with one person married in every 324.83 persons; Little Compton records one person married in every 200.33, and Cranston one in every 135.00 persons.

In the counties the proportions have considerable variation. They stand as follows :

Bristol County, one person married to every 58.73 persons resident; Kent County, one in every 47.42; Newport County, one in every 62.32; Providence County, one in every 49.10, and Washington County, one person married to every 45.72 of the population.

It will be observed that the proportions in the counties do not vary so greatly as in the towns, although the difference between Newport and Washington counties is quite considerable.

The returns from the towns, however, do not represent in every case the whole number of persons married during the year, who are residents of those towns, many persons, for various reasons going into other towns for the purpose of receiving the service of the marriage ordinance.

Cranston, Johnston and North Providence, may be cited as instances of towns having a low marriage rate from that cause.

The maximum and minimum rates of mortality have seldom, if ever, varied so much as during the year 1880. From the very low rate of .44 in Jamestown, or less than four and one-half in each thousand of the population, to 2.46, or more than twenty-four and one-half in each thousand in Cranston is an extraordinary difference. It should be said, however, that deducting the deaths at the State Institutions in that town, the rate would be reduced nearly one-half, and stand lower than a considerable number of other towns in the State.

Following Cranston in the order of highest rates of mortality, are: West Greenwich, 2.26 or more than twenty-two and a half in each thousand; Bristol 2.01, or about twenty in each thousand; Providence city and Woonsocket, each, 1.98 or very nearly the same as Bristol, and Warren with a proportion of 1.92 or rather more than nineteen in each thousand.

The minimum rate of only one death in every 229.50 persons in Jamestown, is seldom paralleled anywhere. Following Jamestown, in the order of a low rate of mortality are: New Shoreham, .49 or less than five in each thousand, and South Kingstown with .78 per cent. of deaths, or less than eight in each thousand.

The proportions in Jamestown are precisely the same as in 1879.

It seemes somewhat singular that the deaths reported in South Kingstown in 1880, should be scarcely half the proportion to the population, of those reported from the adjoining towns. It is to be hoped that the difference is not the result of proper attention to the canvass of the town, and especially as the returns generally have indicated a considerable improvement in the care and completeness of the work.

The following summary will show the rates of mortality in the cities and larger divisions of the State, and the whole State.

Bristol County	19.2 deaths in each thousand persons.
Kent County	14.9 deaths in each thousand persons.
Towns Newport County	12.6 deaths in each thousand persons.
City of Newport	15.4 deaths in each thousand persons.
Newport County	14.5 deaths in each thousand persons.
Towns of Providence County	17.0 deaths in each thousand persons.
City of Providence	19.8 deaths in each thousand persons.
Providence County	18.5 deaths in each thousand persons.
Washington County	12.7 deaths in each thousand persons.
Whole State	17.5 deaths in each thousand persons.

For the purpose of more ready comparison of the different events of births, marriages and deaths in the State during the year 1880, with those of the two preceding years, the following Table is introduced.

Table XV.

Births, Marriages and Deaths in Rhode Island, in each of the three years 1878, 1879 and 1880.

TOWNS AND DIVISIONS OF THE STATE.	Births in 1878.	Births in 1879.	Births in 1880.	Marriages in 1878.	Marriages in 1879.	Marriages in 1880.	Deaths in 1878.	Deaths in 1879.	Deaths in 1880.
Barrington	20	19	17	5	11	12	23	12	21
Bristol	159	135	181	51	40	30	85	82	121
Warren	79	86	80	48	43	55	85	56	77
Bristol County	258	240	278	104	94	97	193	150	219
Coventry	91	75	67	36	28	45	80	64	61
East Greenwich	52	56	53	30	36	43	40	42	53
West Greenwich	23	24	23	7	6	8	16	22	23
Warwick	284	277	297	73	101	121	152	183	169
Kent County	450	432	440	146	171	217	288	311	306
Jamestown	9	6	5	2	4	2	4	2	2
Little Compton	9	13	14	10	3	3	12	12	15
Middletown	32	26	29	6	2	6	13	15	16
New Shoreham	12	17	10	1	4	13	9	6	6
Portsmouth	28	30	32	5	9	11	20	22	26
Tiverton	67	48	50	17	25	36	18	38	42
Towns, Newport County	157	140	140	41	47	71	76	95	107
Newport City	476	303	399	127	122	123	223	264	243
Burillville	130	138	125	34	30	42	66	76	105
Cranston	148	113	120	18	11	22	88	121	146
Cumberland	165	154	143	54	45	56	87	81	107
East Providence	166	168	124	19	27	40	90	93	77
Foster	22	25	22	42	43	26	16	23	21
Glocester	48	47	46	30	24	19	38	33	42
Johnston	135	129	146	27	22	22	46	46	81
Lincoln	335	283	299	54	75	90	208	190	188
North Providence	26	41	29	2	2	......	14	12	16
North Smithfield	62	85	21	28	29	27	38	39	45
Pawtucket	528	483	404	168	172	204	332	319	351
Scituate	80	71	78	40	46	31	71	46	58
Smithfield	74	61	56	20	11	18	30	24	33
Woonsocket	404	370	371	147	160	187	287	274	318
Towns, Providence County	2,323	2,268	1,984	683	697	784	1,411	1,377	1,588
Providence City	2,585	2,522	2,626	1,016	1,071	1,231	1,989	2,026	2,080
Charlestown	14	15	13	7	7	13	15	17	15
Exeter	23	31	30	16	13	14	17	16	20
Hopkinton	65	55	62	41	41	60	47	26	34
North Kingstown	94	96	90	29	27	35	57	46	67
South Kingstown	106	100	88	39	39	36	47	59	40
Richmond	49	48	41	15	7	3	30	21	33
Westerly	114	100	104	60	60	85	48	64	77
Washington County	465	445	428	207	194	246	261	249	286
Whole State	6.714	6,350	6,295	*2,324	2,396	2,769	4,441	4,472	4.829

The diminution of births during the last three years, as shown in Table XV, will not fail to be noticed. It is evident that natural causes are not alone responsible.

Marriages have generally increased in number in proportion to increase of population, and deaths have increased in larger proportion in a majority of the towns, owing in part, doubtless, to causes previously alluded to.

The following Table is introduced in this Report, because it presents in a very concise manner the average relative percentages to population in the different towns, of the births, marriages and deaths, occurring therein for a series of ten years, and because it will doubtless fall under the eye of many persons to whom it may be of interest, and who have had no opportunity of examination in a previous Report. Diagrams are also introduced in this Report for the first time, to present the results shown in Table XVI in another way.

TABLE XVI.

Showing the aggregate number of Births, Marriages and Deaths, in each town and in each county in the State, during the ten years from 1870 to 1880, with the annual average and percentage of the same events to the population; and the aggregate and average age of all the decedents in the same towns and counties for the same period of time.

TOWNS AND DIVISIONS OF THE STATE.	Estimated Average Population, 1870 to 1880.	BIRTHS.			MARRIAGES.			DEATHS.				
		Whole No. Births, 10 years. 1870-1879.	Average to population one in every	Per cent.	Whole No. Marriages, 10 years. 1870-1879.	Average to population one person married in every	Per cent.	Whole No. Deaths, 10 years. 1870-1879.	Average to population one in every	Per cent.	Aggregate Age of all.	Average Age of all.
Barrington	1,185	159	75.96	1.31	63	94.06	1.06	142	83 45	1.19	6,123	43.12
Bristol	5,829	1,738	33.54	2.98	405	71.86	1.39	904	64.37	1.55	31,334	34.66
Warren	4,005	724	55.32	1.81	436	45 93	2.18	656	61.05	1.64	20,977	31.98
BRISTOL COUNTY	11,019	2,618	42.09	2.38	904	60.95	1.64	1,702	64.74	1.54	57,434	33.77
Coventry	4,580	754	60.74	1.65	363	63.09	1.58	672	68 15	1.47	27,400	40.77
East Greenwich	3,120	629	49.60	2.02	305	51.15	1.96	500	62.40	1.63	20,083	40.17
West Greenwich	1,034	244	42.79	2.34	75	62.26	1.61	177	58.42	1.71	8,102	45.78
Warwick	11,614	2,498	46.49	2.15	1,063	54.11	1.85	1,461	79.49	1.26	43,589	29.15
KENT COUNTY	20,348	4,125	49.33	2.02	1,806	56.33	1.77	2,810	72.41	1.38	99,174	35.29
Jamestown	488	49	99.59	1.00	22	101.90	.98	42	116.19	.86	2,168	51.62
Little Compton	1,156	187	61.82	1.62	69	83 77	1.19	140	82.57	1.21	7,517	53.69
Middletown	1,074	195	55.08	1.82	49	109.56	.91	124	86.61	1.15	5,583	45.03
New Shoreham	1,147	208	55.15	1.81	80	71.69	1.39	111	103 33	.96	4,151	37.39
Portsmouth	1,893	255	74 22	1.35	96	98.59	1.01	216	87.64	1.14	10,231	47.32
Tiverton	2,101	470	44.67	2.24	269	39.05	2 56	285	73.72	1 36	12,271	43 05
TOWNS, NEWPORT CO.	7,859	1,364	57.62	1.65	585	67.17	1.49	918	85.61	1.17	41,921	45.66
NEWPORT CITY	14,028	3,386	41.43	2.42	1,173	59.79	1.67	2,041	68.73	1.45	74.533	36.51
NEWPORT COUNTY	21,887	4,750	46 09	2.16	1,758	62.25	1.60	2,959	73.97	1.35	116,454	39.35

TOWNS AND DIVISIONS OF THE STATE.	Estimated Average Population, 1870 to 1880.	BIRTHS.			MARRIAGES.			DEATHS.				
		Whole No. Births, 10 years. 1870–1879.	Average to population one in every	Per cent.	Whole No. Marriages, 10 years. 1870–1879.	Average to population one person married in every	Per cent.	Whole No. Deaths, 10 years. 1870–1879.	Average to population one in every	Per cent.	Aggregate Age of all.	Average Age of all.
Burrillville	5,249	1,140	46.05	2.17	320	82.02	1.22	677	77.53	1.29	22,966	33.92
Cranston	5,688	1,286	44.23	2.26	174	163.42	.61	1,045	54.43	1.82	39,417	37.72
Cumberland	5,673	1,228	46.20	2.16	622	45.60	2.19	640	88.64	1.13	19,566	30.56
East Providence	4,336	1,003	43.23	2.31	263	82.41	1.21	592	73.24	1.36	16,730	28.26
Foster	1,543	212	72.78	1.37	236	32.69	3.06	151	102 20	.98	8.025	53.14
Glocester	2,098	421	49.83	2.01	234	44.83	2.23	335	62 03	1.61	15,052	44.93
Johnston	4,999	1,159	43.13	2.32	228	110.00	.90	745	67.10	1.49	23,047	30.94
Lincoln*	11,565	2,923	35.61	2.80	514	101.25	.99	1,575	66.08	1.51	34,869	22.14
North Providence†	1,303	191	40.92	2.44	37	106.50	.94	113	69.18	1.45	3,344	29.60
North Smithfield*	2,797	537	46.88	2.13	221	62.83	1.59	322	78.17	1.26	10,353	32.15
Pawtucket	18,464	4,124	44.77	2.23	1,349	68.34	1.46	2,062	89.49	1.12	61,474	29.81
Scituate	4,101	688	59.62	1.61	472	43.33	2.30	547	74.97	1.32	22,098	40.39
Smithfield‡	2,857	611	46.76	2.14	309	45.74	2.12	421	67.86	1.47	15,208	36.12
Woonsocket	13,576	3,741	36.29	2.76	1,522	47.88	2.09	2,628	51.66	1.92	64,352	21.49
TOWNS, PROVIDENCE CO.	84,249	18,264	46.67	2.14	7,282	57.77	1.73	13,440	62.68	1.59	391,875	29.15
PROVIDENCE CITY	88,358	23,950	37.00	2.70	10,399	42.48	2.35	17,587	50.24	1.99	488,256	27.76
PROVIDENCE COUNTY	184,924	42,214	43.81	2.28	17,681	52.30	1.90	31,027	59.60	1.67	880,131	28.37
Charlestown	1,054	173	60.92	1.64	70	75.29	1.33	151	69.80	1.42	728	51.33
Exeter	1,355	185	73.21	1 36	160	42.34	2.36	159	85.22	1.17	8,202	51.58
Hopkinton	2,760	604	45.69	2.19	209	63.60	1.57	392	70.41	1.42	15,983	40.78
North Kingstown	3,505	772	45.40	2.20	266	65.88	1.52	553	63.38	1.58	22,539	40.76
South Kingstown	4,240	974	43.53	2.29	373	56.84	1.77	602	70 43	1.41	26,484	43.99
Richmond	1.739	411	42.31	2.36	144	60.38	1.65	299	58.46	1.71	11,415	38.18
Westerly	5,408	945	57.23	1.73	635	42.58	2.35	603	89.68	1.11	20,897	34.66
WASHINGTON COUNTY	20,061	4,064	49.36	2.03	1,857	54.01	1.85	2,759	72.71	1.37	112,501	40.52
WHOLE STATE	258,239	58,771	44.75	2.23	24,006	53.79	1.86	41,257	62.59	1.59	1,265,694	30.68

* Nine years. Organized March, 1871. † Six years. Divided May, 1874. ‡ Nine years. Divided March, 1871.

In Table XVI., will be found the aggregate number of births, marriages and deaths that occurred in each of the several towns of the State, during a period of ten years, with the annual average to the population, and average percentage of the same.

In the division of deaths, there will also be found the aggregate age of all the decedents in each of the towns, during the same period, and the average age of all.

The population of the State has been gradually, though not rapidly, increasing, in nearly all of the towns, and has therefore changed more or less in numbers in each of them, during the period of ten years. It was, therefore, desirable to ascertain, as far as possible, the average population of each of the towns during the period of time taken, for the purpose stated. Upon finding the average population of several towns, it was seen that the number was near the population by the Census of 1875, and the number by that Census presenting an approximate mean sufficiently near for all practical purposes, it was therefore adopted as a basis for the averages and percentages of the same, with few exceptions.

The exceptions of towns to the whole number of ten years in the preceding Table, are: Lincoln, North Smithfield and Smithfield, which were organized as at present constituted in 1871, and therefore cover a period of nine years, and North Providence, which was divided in 1874, and covers a period of six years only. Providence had a considerable accession of population from North Providence, in 1874, which has been taken into account in the estimated average.

It will be seen upon an examination of Table XVI., that the proportions of the average number of each of the several classes of events to the population of the towns and sections where they occur, vary very considerably even in a long series of years, though very much less than during single years.

It will also be noticed that the larger the population, the more uniform, as a rule, will be the percentages, especially of births and deaths. The aggregation of the town populations into counties is an example.

BIRTHS.

In the division of births, it will be found that the average proportion of that class of events, to the population, varies from one birth in every 33.54 persons, or nearly three per cent., in Bristol, to one birth in every 99.59 persons, or about one per cent., in Jamestown.

The towns having an exceptionally high birth rate, following Bristol, are: Lincoln, one birth in every 35.61 persons; Woonsocket, one in every 36.29; North Providence, one in every 40.92 persons.

Following Jamestown, the towns having a noticeably low birth rate, are: Barrington, one birth in every 75.96 persons; Portsmouth, one in every 74.22; Exeter, one in every 73.24; and Foster, one in every 72.78 persons.

Among the larger aggregate populations of the State, Providence city and Bristol county show the largest proportion of births to population; that is, Providence one in every 37 persons, or 2.70 per cent., and Bristol county one in every 42.00 persons, or 2.38 per cent.

The towns of Providence county show an average birth rate of one to every 46.67 persons, or 2.14 per cent.; Washington county, one in every 49.36 persons, or 2.03 per cent.; and Kent county, one in every 49.33, or 2.02 per cent.

In Newport county towns, the birth rate is one birth in every 57.62 of the population, or 1.65 per cent., while in Newport city, the proportion is one in every 41.43 persons, or 2.42 per cent. The difference of birth rates between the towns of Newport county and the city of Newport, for the term of ten years, is rather less than for the last five years.

In Newport county, the average proportion is one birth in every 46.09 persons, or 2.16 per cent., and in Providence county, one in every 43.81, or 2.28 per cent.

The annual average for the whole state is one in every 44.75 persons, or 2.23 per cent of the population.

MARRIAGES.

For various obvious reasons, the marriage rates of the different towns present very much less uniformity than those of either births or deaths. The proportions vary from one person married in every 32.69 of the population, or 3.06 per cent., in Foster, to one person married in every 163.42 persons, or 0.61 per cent., in Cranston—a difference of more than five to one.

The towns having an unusually high marriage rate, following Foster, are: Tiverton, with an average annual rate of one person married in every 39.05 of the population, or 2.56 per cent.; Exeter, 2.36 per cent,; Westerly, 2:35 per cent.; and Glocester, 2.23 per cent.

At the other extreme, following Cranston, are: Johnston, with one person married in every 110.00 persons, or .90 per cent.; Middletown, .91 per cent.; and North Providence, Jamestown and Lincoln, each falling short of one per cent. of the population in the annual average.

In the counties, the ratios of persons married, to the population, are seen to be much more uniform. The percentages are as follows: Bristol county, 1.64 per cent.; Kent county, 1.77 per cent.; Newport county, 1.60 per cent.; Providence county, 1.90 per cent.; and Washington county, 1.85 per cent.

In the whole State, for the period of ten years, the annual average is one person married to every 53.79 persons, or 1.86 per cent.

DEATHS.

The greatest mortality, in proportion to population, is found in the city of Providence, with an annual average of one decedent to every 50.24 persons, or 1.99 per cent.; following which is the town of Woonsocket, with an annual average of one decedent in every 51.66 of the population, or 1.92 per cent. Following Woonsocket in the bad eminence of a high death rate, are: Cranston, with the average annual ratio of 1.82 per cent.; Richmond and West Greenwich, 1.71 per cent. each. For the period of ten years, no town in the State shows an average annual death rate as high as two per cent., the city of Providence however falling short by only a small fraction.

The minimum ratio of mortality to population, is found in the town of Jamestown, with one decedent to every 116.19 persons, or 0.86 per cent. Jamestown, it will be remembered, had also the minimum percentage of births.

As a rule, it will be found that a high birth rate in any town will also be attended by a high death rate. The reason will be obvious, when it is remembered that of every 100 children born in the State of Rhode Island, during the last twenty-five years, 35 have ceased to exist at the end of five years.

Next to Jamestown, the towns showing a low rate of mortality, are: New Shoreham, one decedent in every 103.33 persons, or 0.96 per cent., and Foster, one in every 102.20 persons, or 0.98 per cent.

Newport city shows an average annual mortality of 14.5 in each one thousand, and Providence city, 19.9 in each one thousand.

In the counties, the ratios of mortality are as follows:

Bristol County	15.4 in each one thousand.
Kent County	13.8 in each one thousand.
Newport County	13.5 in each one thousand.
Providence County	16.7 in each one thousand.
Washington County	13.7 in each one thousand.
Whole State	15.9 in each one thousand.

There is a small relative loss in the State in leaving out the decedents in North Providence previous to 1874, and it cannot be said that the estimated average population is absolutely exact within a score of persons, but it will be admitted that the numbers taken are sufficiently approximate for relative comparisons, and all other practical purposes.

In order to facilitate comparisons of the average percentages to the population, of the births, marriages and deaths in the different counties of Rhode Island, and also the State, during the period of ten years from 1870 to 1879, inclusive, the following synopsis is presented:

	Births, one in every	Marriages, one person married in every.	Deaths, one in every
Bristol County	42.09	60.95	64.74
Kent County	49.33	56.33	72.41
Newport County	46.09	62.25	73.97
Providence County	43.81	52.30	59.60
Washington County	49.36	54.01	72.71
Whole State	44.75	53.79	62.59

It may be of interest to contrast the births, on the basis of each 100 of the same, during the last ten years, with the number of persons married, and with the number of deaths for the same period, in each of the larger divisions of the State, and in the whole State.

In Bristol county, the aggregate of births for the period named, was 2,618; number of persons married, 1,808; number of deaths 1,702. The proportions, therefore stands as follows: For every 100 births there were 65.01 deaths, and 34.50 marriages, or 69.00 persons married.

In Kent county, the aggregates were: Births, 4,125; marriages, 1,806; deaths, 2,810. The proportions are as follows: For every 100 births there were 43.78 marriages, or 87.56 persons married, and 68.12 persons died.

In Newport county there were 4,750 births, 1,758 marriages, and 2,959 deaths. The ratio for every 100 births, 37.16 marriages, or 74.23 persons married, and 62.30 persons died.

In Providence county there were 42,214 births, 17,681 marriages, and 31,027 deaths. For every 100 births there were 41.88 marriages, or 83.77 persons married, and 73.50 deaths.

In Washington county there were 4,064 births, 1,857 marriages, and 2,759 deaths. For every 100 births there were 45.69 marriages, or 91.38 persons married, and 67.90 persons died.

In the whole State, for the same period, there were 58,771 births, 24,006 marriages, or 48,012 persons married, and 41,257 persons died. The proportions for the whole State are, therefore, for every 100 births there were 40.84, marriages, or 81.69 persons married, and 70.20 persons died.

The following recapitulatory summary will present the foregoing remarks more concisely and clearly.

		Persons married.	Deaths.
Bristol County	To every 100 births there were	69.00	65.01
Kent County	To every 100 births there were	87.56	68.12
Newport County	To every 100 births there were	74.23	62.40
Providence County	To every 100 births there were	83.77	73.50
Washington County	To every 100 births there were	91.38	67.90
Whole State	To every 100 births there were	81.69	70.20

AVERAGE AGE.

It will be borne in mind, that the circumstance of average individual longevity, in any town or division of the State is not dependent on the relative healthfulness of the location. The surroundings must be necessarily salubrious to promote length of life; but the character of the habitations, the home methods of living, dietetic and otherwise, the public habits and customs, the average intelligence, industry and morality of the populace, are potent factors of the length or brevity of life.

Then the circumstance of slow increase of population, owing to the departure, at an early age, of a large proportion of the population to engage in the active occupations of life, in other localities, and leaving but a meagre percentage of young adults to establish families, in the child bearing period of life, and the necessary corollary of a diminished percentage of births, of which about 35 in each 100 would be expected to have ceased to exist at the expiration of the fifth year, thus *lowering* the average age in towns having a high birth rate, and *raising* it in towns having a low birth rate.

It will, therefore, be understood that to obtain a fairly approximate knowledge of the relative healthfulness of the towns, and consequent relative longevity of the inhabitants of each, the various circumstances alluded to above must be taken into consideration.

Upon consultation of Table XVI., it will be seen that the maximum average age of all the decedents during the last ten years, was in the town of Charlestown; that is, 54.33 years. The minimum average age of the whole number of decedents, for the same period, was in the town of Lincoln; that is, 22.14 years.

It will be noticed that the birth rate in Charlestown is but little more than half that of Lincoln, and a reasonable inference would be that the higher average age at death in Charlestown was owing, in great part at least, to the absence of a large proportional number of that class which is peculiarly subject to fatal diseases at an early age.

Following Charlestown, in presenting an advanced average age at the time of decease, are: Little Compton, 53.69 years; Foster, 53.14 years; Jamestown, 51.62 years; Exeter, 51.58 years.

Of the minimum average age, next to Lincoln, are: Woonsocket, 24.49 years; Providence city, 27.76 years; East Providence, 28.26 years; Pawtucket, 29.81 years.

The following summary will show the average age of decedents in the different counties and in the whole State:

Bristol County	Average age at death 33.77 years.
Kent County	Average age at death 35.29 years.
Newport County	Average age at death 39.35 years.
Providence County	Average age at death 28.37 years.
Washington County	Average age at death 40.52 years.
Whole state	Average age at death 30.68 years.

TABLE XVII.

Showing the proportions of Births, Marriages and Deaths, to the population, in the aggregate for the whole State, in each of the last eleven years.

YEARS.	BIRTHS.		MARRIAGES.		DEATHS.		
	Number.	To population one birth in	Number.	Of population one person married in	Number.	Of population one death in	Deaths in each 100 of the population.
1869	5,245	41.4	2,289	47.5	3,382	64.2	1.56
1870	5,215	41.7	2,362	46.0	3,238	67.1	1.49
1871	5,678	38.2	2,336	46.5	3,344	65.0	1.54
1872	6,143	35.4	2,537	42.9	4,247	51.2	1.95
1873	6,022	36.1	2,630	41.3	4,403	49.4	2.03
1874	6,466	39.9	2,541	50.8	4,229	61.1	1.64
1875	6,508	39.7	2,485	52.0	4,317	59.8	1.67
1876	6,329	40.8	2,253	57.3	4,116	62.7	1.59
1877	6,235	41.4	2,282	56.6	4,450	58.0	1.72
1878	6,714	38.5	2,324	55.7	4,441	58.1	1.72
1879	6,350	43.6	2,396	57.8	4,472	61.9	1.60
1880	6,295	43.9	2.769	49.9	4,829	57.3	1.75

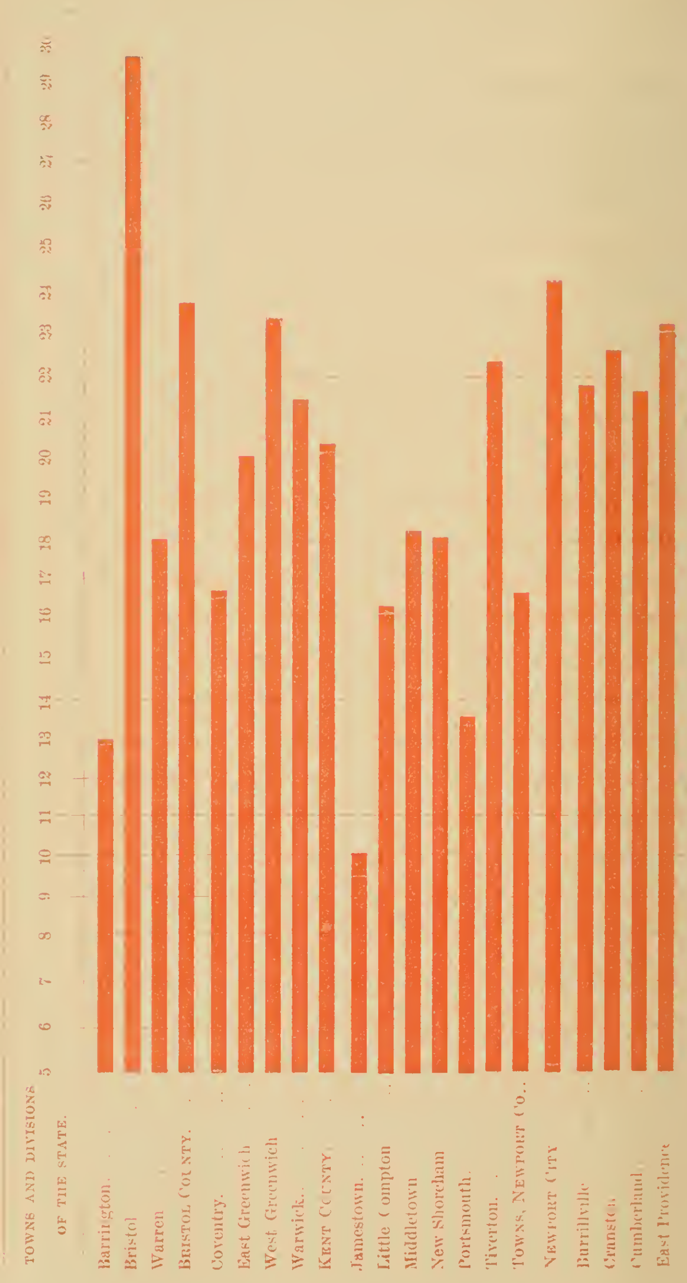
It will be seen by the above Table, that the number of births recorded in the State during the year 1880, was less by 55 than during the preceding year, and less by 419 than in 1878.

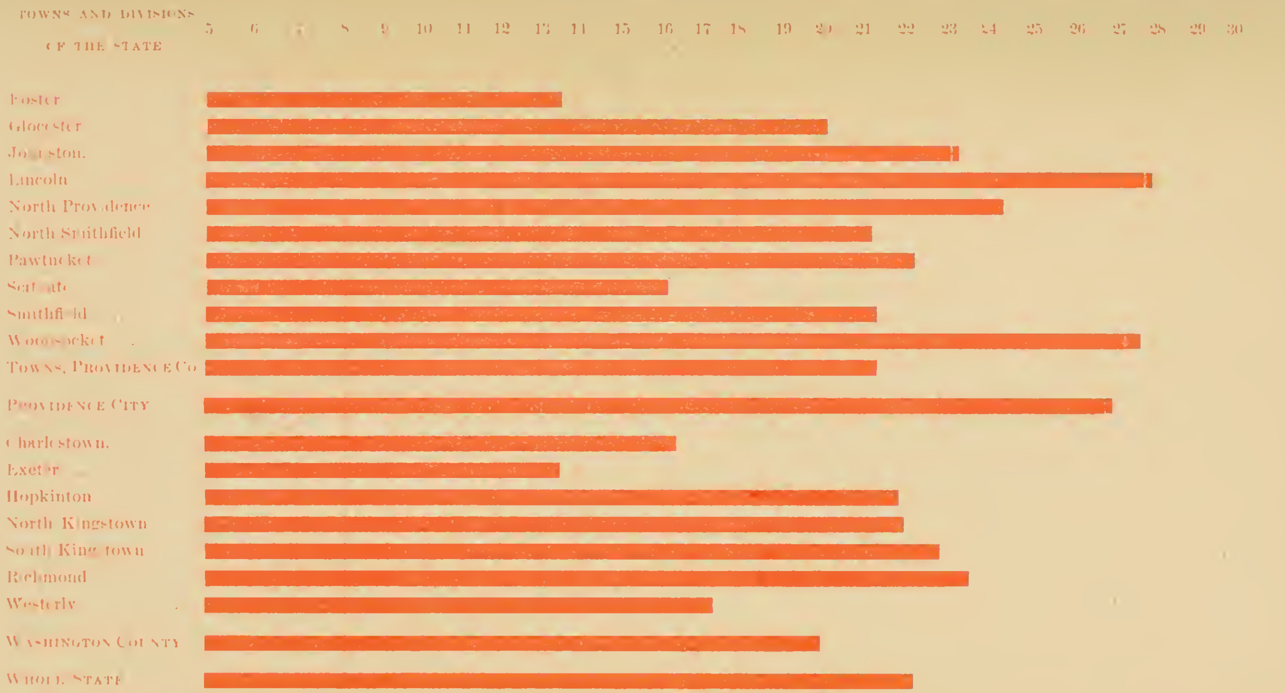
The difference between the numbers reported in 1878 and 1880 is not greater than has occured before, and considerable fluctuation may be considered the rule.

The proportion of births to population, in the whole State, according to the Census of 1880, is one to every 43.9, or about 2.3 per cent. The proportion of one birth in every 38.5 as given in the Report for 1878, was based upon the State Census of 1875, and, as then stated, was larger than the actual population at the time would warrant.

BIRTH RATE.

Diagram showing the annual average of births in each 1000 of the population in each town in the State, during the period of ten years, from 1870 to 1879, inclusive.

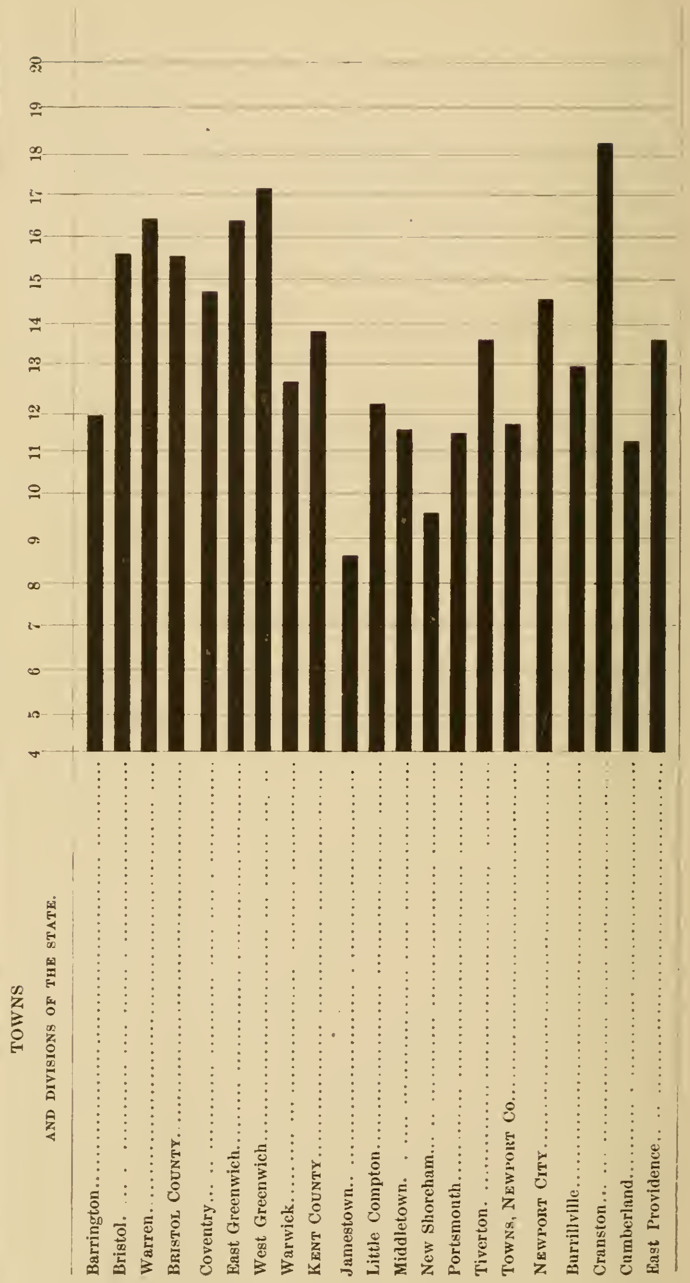


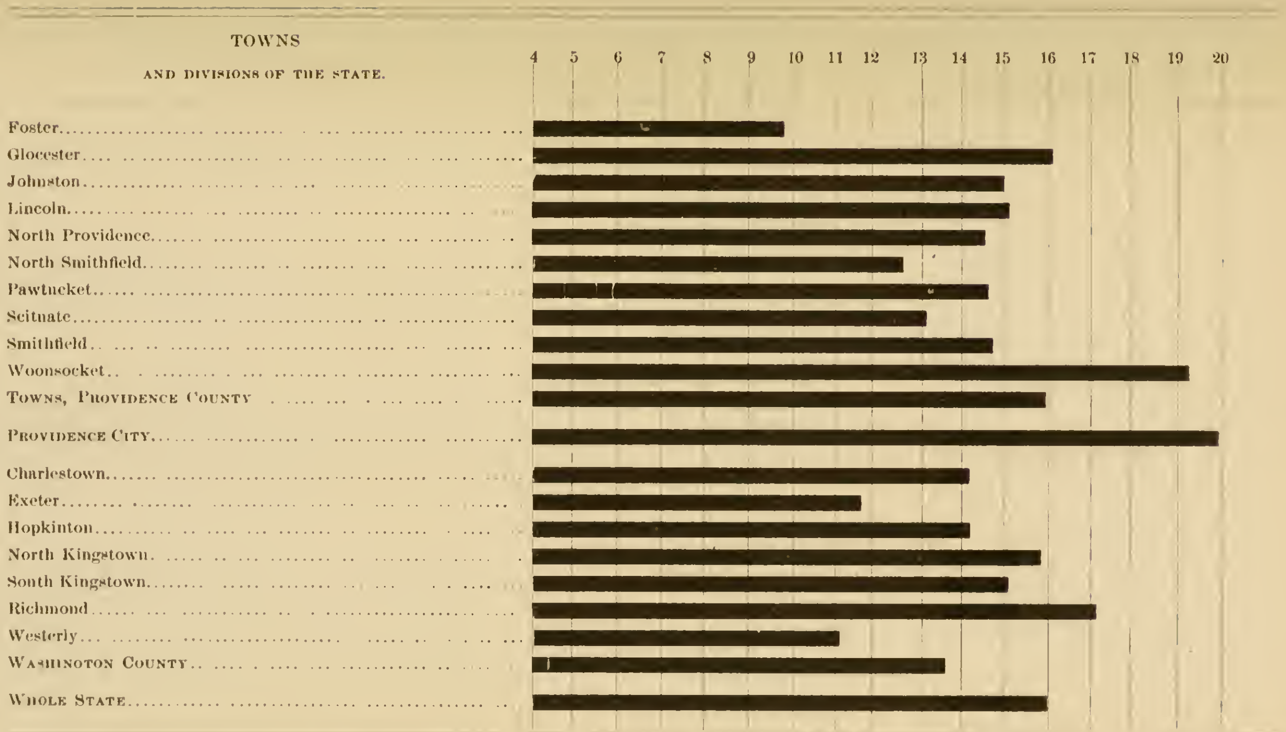


The figures at the top of the perpendicular lines indicate, in whole numbers, the average of births each year in every 1000 persons. The spaces are fractional parts of one. For instance the heavy horizontal line against Barrington reaches to the perpendicular line 13. It shows the birth rate of Barrington to be about 13 in each 1000.

DEATH RATE.

Diagram showing the annual average of deaths in each 1000 of the population in each town in the State, during the period of ten years, from 1870 to 1879, inclusive.





The figures at the top of the perpendicular lines indicate, in whole numbers, the average of deaths each year in every 1000 persons. The spaces are fractional parts of one. For instance, the heavy horizontal line against Barrington reaches to the perpendicular line 12. It shows the average annual death rate of Barrington was about 12 in each 1000.

BIRTHS, 1880.

The general statistics of births in Rhode Island during the year 1880, derived from the returns sent to this office, may be found on pages 2 to 6 inclusive, in Tables I, II and III.

The whole number reported is 6,295, and as before stated, is 55 less than that of 1879.

SEX OF THE CHILDREN BORN.

Of the 6,295 children whose births were reported in 1880, there were 3,241 males and 3,054 females. This gives 104.8 males to each 100 females, or 51.48 males and 48.52 females in each 100 children.

The following recapitulatory Table shows the numbers and sex, and the proportions of each sex of the children born in Rhode Island, in each of the last twenty-seven years:

TABLE XVIII.

Years.	Males.	Females.	Males to each 100 Females.	Males.	Females.
1854	1,081	1,003	107.8, or	51.87 and	48.13 in each 100
1855	1,492	1,421	105 0, or	51.22 and	48.78 in each 100
1856	1,479	1,407	105.1, or	51.25 and	48.75 in each 100
1857	2,057	1,948	105.6, or	51.36 and	48.64 in each 100
1858	2,200	2,053	107.2, or	51.73 and	48.27 in each 100
1859	2,209	2,097	105.3, or	51.30 and	48.70 in each 100
1860	2,263	2,212	102.3, or	50.57 and	49.43 in each 100
1861	2.531	2,291	110.5, or	52.49 and	47.51 in each 100
1862	2,152	1,967	109.4, or	52.25 and	47.75 in each 100
1863	1,892	1,288	105.8, or	51.41 and	48.59 in each 100
1864	1,949	1,942	100.3, or	50.09 and	49.91 in each 100
1865	2,096	1,857	112.9, or	53.02 and	46.98 in each 100
1866	2,546	2,356	108.0, or	51.94 and	48.06 in each 100
1867	2,665	2,464	107.0, or	51.87 and	48.13 in each 100
1868	2,745	2,627	104.5, or	51.10 and	48.90 in each 100
1869	2,685	2,560	104.9, or	51.19 and	48.81 in each 100
1870	2,679	2,536	105.6, or	51.37 and	48.63 in each 100
1871	2,878	2,800	102.8, or	50.69 and	49.31 in each 100
1872	3,085	3,058	100.9, or	50.22 and	49.78 in each 100
1873	3,135	2,887	108.6, or	52.06 and	47.94 in each 100
1874	3,311	3,155	104.9, or	51.21 and	48.79 in each 100
1875	3,362	3.146	106.9, or	51.66 and	48.34 in each 100
1876	3,291	3,038	108.3, or	52.00 and	48.00 in each 100
1877	3,163	3,072	103.0, or	50.73 and	49.27 in each 100
1878	3,402	3,312	102.7, or	50.67 and	49.33 in each 100
1879	3,259	3,091	105.4, or	51.32 and	48.68 in each 100
1880	3,241	3,054	106.8, or	51.48 and	48.52 in each 100

The number of children whose births were recorded in 1880, were not only less than in the preceding year, but also less than in any preceding year since 1873, with the exception of 1877, when the slightly smaller number was of the male sex only. The number of male children born in 1880 was 18 less than in 1879, and 161 less than in 1878. The number of female children in same year was 37 less than in 1879, and less than in any preceding year since 1876.

PROPORTION OF THE SEXES.

The proportion of each sex to the whole number varies more or less every year, as might reasonably be expected.

In Table II, on pages four and five, may be found the number of the children born in the different divisions of the State during the year, and in the several months of the year, with the number of each sex respectively.

The following Table will present, in a more concise manner, the whole number of children of each sex in each division, whose births were recorded during 1880.

Table XIX.

BIRTHS, 1880.	Bristol County.	Kent County.	Newport County, Towns.	Providence County, Towns.	Washington County.	Newport City.	Total.	Providence City.	Whole State.
Males	150	231	81	1,004	209	205	1,880	1,361	3,241
Females	128	209	59	980	219	194	1,789	1,265	3,054
Total	278	440	140	1,984	428	399	3,669	2,626	6,295
Males to each 100 Females	117.2	110.5	137.3	102.4	95.4	105.6	105.1	107.6	106.1

There has been no year during the whole period of registration in which the number of male children born during the year has not exceeded the number of female children born during the same time.

This is shown very clearly in Table XVIII. In 1865 the proportion was 112.9 males to each 100 females, or about 53 males and 47 females in each 100 births, an excess of 60 males in each thousand births.

In 1880, the male children born were in excess in every county except Washington, and also in excess in the cities of Providence and Newport.

The proportions however vary considerably. In Bristol County the males were 117.2 to each 100 females, while in Washington County the males were only .95 to each 100 females; Kent County shows a proportion of 110.5 males, and Newport County Towns 137.3 males to each 100 females.

The larger the population, the less will be the variation from year to year. In the city of Providence and in the whole State, the variations have, with one or two exceptions, scarcely exceeded three or four in a hundred within the last twenty-eight years.

The proportions in the whole State for 1880, were 106.1 males to each 100 females; in the city of Providence, 107.6 males, and in the State, excluding Providence, 105.6 males to each 100 females.

PROPORTION OF THE SEXES.

Contrast of the city of Providence with the rest of the State.

In order to illustrate the difference, if any exist, between city life, and village and country life, as found in Rhode Island, a comparison of the statistics of births in the city of Providence, with those reported from the rest of the State, will be presented.

These comparisons would hardly be a fair test of the influences of city life, as they might be found in cities less favored than the city of Providence, in regard to location, and other circumstances and conditions favorable to health, and a purely country life.

There are several large and many small villages in the State, and parts of the city of Newport, where may be found existing all the conditions contributing to either temporary physical or mental exaltation, or final mental and physical degeneration, almost, if not quite as largely as any locations in the city of Providence.

The whole number of births in the city of Providence during the year 1880 was 2,626, of which 1,361 were males, and 1,265 were females. The proportion of males to females would, therefore, be as follows: 107.6 males to each 100 females, or 51.82 males and 48.18 females in each 100 children born.

In the rest of the State, during the same year, the whole number of children born was 3,669, of which 1,880 were males, and 1,789 were females, or 51.24 males and 48.76 females in each 100 births.

The following shows the proportion of the sexes of the children born in Providence, and in the rest of the State, during the years 1878, 1879 and 1880; and also in the twenty-five years from 1854 to 1878, inclusive:

1878.

	Males.	Females.	Males to each 100 Females.	Males.	Females.
Providence City	1,335	1,250	106.8, or	51.64 and	48.36 in each 100.
Rest of the State	2,067	2,062	100.2, or	50.06 and	49.94 in each 100.

1879.

	Males.	Females.	Males to each 100 Females.	Males.	Females.
Providence City	1,297	1,225	105.7, or	51.43 and	48.57 in each 100.
Rest of the State	1,962	1,866	105.1, or	51.25 and	48.75 in each 100.

1880.

	Males.	Females.	Males to each 100 Females.	Males.	Females.
Providence City	1,361	1,265	107.6, or	51.82 and	48.18 in each 100.
Rest of the State	1,880	1,789	105.1, or	51.24 and	48.76 in each 100.

TWENTY-FIVE YEARS, 1854 TO 1878, INCLUSIVE.

	Males.	Females.	Males to each 100 Females.	Males.	Females.
Providence City	24,051	22,774	105.6, or	51.36 and	48.64 in each 100.
Rest of the State	38,297	35,723	107 2, or	51.74 and	48.26 in each 100.

A period of a quarter of a century affords a very fair number of years for summing up the results of single years, for the purpose of ascertaining the general averages, and arriving at approximate conclusions to say the least.

From the averages of twenty-five years, 1854 to 1878 inclusive, as shown in the summary above, it would seem that the influences of city life as existing in the city of Providence, and the influences of village and country life as existing elsewhere in the State, in the causation of sex, were not very dissimilar, or that the differences of sex in the children born in Rhode Island, were but slightly influenced by them.

The following Table, continued from the last report, shows the relative proportions of the sexes, in each of the last eighteen years, in each of the larger divisions of the State, and in the whole State:

TABLE XX.

NUMBER OF MALES TO EACH 100 FEMALES.

BIRTHS.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.	Whole State.
1863	120.0	98.4	97.0	101.8	111.4	108.7	105.8
1864	106.8	87.3	90.6	107.4	97.3	103.4	100.3
1865	119.3	118.2	108.8	118.9	113.8	88.1	112.9
1866	109.4	113.1	103.4	104.9	108.4	124.0	108.0
1867	115.5	98.3	117.8	106.3	104.5	120.4	107.7
1868	117.4	88.7	100.2	101.6	102.4	136.5	104.5
1869	115.7	116.7	102.7	98.0	107.5	120.6	104.9
1870	126.4	111.6	100.0	105.1	104.9	99.5	105.6
1871	131.8	97.9	132.5	100.8	95.2	113.3	102.8
1872	109.2	92.8	109.1	103.5	95.7	110.6	100.9
1873	129 2	113.0	117.9	104.5	109.0	104.7	108.6
1874	98.7	111.9	101.3	110.4	102.9	94.0	104.9
1875	95 2	103.1	97.7	104 3	109.1	134.3	106.9
1876	142.1	104.4	108.5	108.0	106.8	103.7	108.3
1877	138.7	102,4	98.5	100.3	104.9	95.3	103.0
1878	120.5	120.6	94.8	101.5	106.8	78.8	102.7
1879	124.3	95.5	103.6	105.4	105.7	106.3	105.4
1880	117.2	110.5	113.0	102.4	107.6	95.4	106.1

The difference in the number of each sex comparatively, as they vary from year to year in the different divisions of the State, is a matter of some curiosity. Thus, we find by an examination of Table XX, that in Bristol County, in 1876, the proportions were 142.1 males to each 100 females, while in the preceding year there were but 95.2 to each 100 females. In Washington county, in 1868, the proportions were 136.5 males to each 100 females; while in 1878, in the same county, they stood 78.8 males to each 100 females. Nothing is known as to the causes of these differences, and they are simply regarded as fortuitous events. And why there should be in every year, in every population of more than fifty thousand persons, a preponderance of births of male children, is a question still unsettled.

From observations made by physicians for all the periods of medical writings, it does not appear that the greater physical vigor of either parent, has much influence in the causation of sex.

During 1880, Bristol County reported the largest proportion of males to females, and the same may be said of that county during the last five years, showing a proportionate average for that period of 128.5 males to each 100 females.

The town of Bristol has not only shown a large proportion of males to females, but has also the highest birth rate of any town in the State.

BIRTHS: SEX AND SEASON.

The number of births as they occurred during the several months in the year 1880, and the different divisions of the State in which they occurred, may be found in Table II, page 4. From it the number of children born during each month and quarter of the year may be ascertained, and the relative proportions of the sexes, during each of these periods, and also the aggregates and proportions of the same for the whole State.

The following Table will present a summary of the quarterly periods, number of births and proportions of the sexes for those periods, in the whole State:

	Males.	Females.	Males to each 100 Females.	Males.	Females.
1. January—March	796	725	109,7, or	52 3 and	47.7 in each 100.
2. April—June	735	748	98.2, or	49.5 and	50.5 in each 100.
3. July—September	834	806	103.4, or	50.7 and	49.3 in each 100.
4. October—December	876	775	113.0, or	53.0 and	47.0 in each 100.
Whole Year, 1880	3,241	3,054	106.1	51.5 and	48.5 in each 100.

The following Table, continued from the last report, shows the number of male children born to each 100 female children, in each quarter of each of the last fifteen years:

TABLE XXI.

YEARS.	1880.	1879.	1878.	1877.	1876.	1875.	1874.	1873.	1872.	1871.	1870.	1869.	1868.	1867.	1866.
1st Quarter	109.7	104.6	106.6	107.9	105.7	97.7	100.4	98.3	98.8	112.4	111.6	107.3	102.4	105.5	108.7
2d Quarter	98.2	104.2	98.9	103.1	109.2	113.8	108.2	105.9	100.5	95.0	100.8	105.1	118 8	108.9	102.9
3d Quarter	103.4	101.6	103.8	97.6	108.0	108.2	105.1	109.9	101.6	99.3	101.0	101.9	103.1	110.4	113.8
4th Quarter	113.0	111.4	102.0	104.2	110.4	107.9	105.9	110.4	103.4	105.0	109.2	105.6	96.2	106.5	106.6
Whole Year	106.1	105.4	102.7	103.0	108.3	106.9	104.9	108.6	100.9	102.8	105.6	104.9	104.5	107.7	108.0

The proportions of the sexes of children born during 1880 in Rhode Island, in the different quarterly periods, have varied more than the average of fifteen years. There was a difference of about six per cent. more of males than of the opposite sex, between the first and third quarters; and a difference of seven and one-half per cent. in favor of the male sex, between the second and fourth quarters.

The proportion of the whole year, 106.1 males to each 100 females, is larger than the average of fifteen years, which is 105.0 males to each 100 females.

The possible influence of season in the causation of the sex of the children born in Rhode Island, may be more fully illustrated by the following summary prepared for that purpose, and which shows the number and sex of the children born in the State in each quarter of the year, and also the proportions of the sexes in each quarter, in the aggregate of a period of twenty years next preceding 1880:

	Males.	Females.	Males to each 100 Females.	Males.	Females.
1. January—March	12,912	12,202	105,8, or	51.41 and	48.59 in each 100 births.
2. April—June	13,006	12,226	106.4, or	51.55 and	48.45 in each 100 births.
3. July—September	14,188	13,611	104.3, or	50.85 and	49.15 in each 100 births.
4. October—December	14,971	14,072	106.4, or	51.55 and	48.45 in each 100 births.
Whole No. 20 years	55,077	52,151	105.6, or	51.37 and	48.63 in each 100 births.

It will be seen that the greatest average difference between the numbers of the sexes born in the different quarters, is between the third quarter; and the second and fourth, which are alike. This difference of 104.3 males to each 100 females, in the third quarter, or about 2.2 per cent. males in excess of females in each 100 children born of both sexes, compared with the largest average of any quarter, that is 106.4 males to each 100 females, or about 3.2 per cent. males in excess of females, and which is less than one per cent., is not strongly confirmatory of a belief that season has any decided influence in the causation of sex.

BIRTHS AND SEASON.

The influence of season in regard to human productiveness, including the whole number of children of both sexes born, may also claim attention as a question of considerable importance.

The following Table shows the total number of children born in the State of Rhode Island, (according to the returns,) in each quarter of each of the last ten years; and also the aggregate number and the percentage of the aggregate in each quarter for twenty-seven years, from 1853 to 1879, inclusive:

Table XXII.

QUARTERS.	1880.	1879.	1878.	1877.	1876.	1875.	1874.	1873.	1872.	1871.	1853 to 1879.	
											Number.	Per cent.
January—March. ..	1,521	1,465	1,622	1,399	1,524	1,546	1,485	1,382	1,348	1.332	30,402	23.71
April—June.... ...	1,483	1,556	1,565	1,406	1,496	1,608	1,555	1,399	1,464	1.299	30,115	23.50
July—September...	1,640	1,653	1,731	1,674	1,668	1,668	1,682	1,583	1,663	1,475	33,599	26.21
October—December	1,651	1,676	1,796	1,756	1,641	1,686	1,744	1,658	1,668	1,572	34,079	26.58
Whole year........	6,295	6,350	6,714	6,235	6,329	6,508	6,466	6,022	6,143	5,678	128,195	100.00

During a period of twenty-seven years, as will be seen by the above Table, the average order of the occurrence of births in the different quarters of the year, from the smallest number upward, has been as follows, viz. second, first, third, fourth. The returns for 1880 show the same result.

The year 1880 also follows the rule of the long period in returning a considerably smaller number during the first than during the last half of the year, although the difference is not as great during 1880, in which year the proportions stand 47.7 of the whole number during the first half, and 52.3 during the last half, as against the average of 47.2 during the first, and 52.8 during the last half of the years composing the long period.

It has been mentioned in previous reports, that in the city of Providence when the facts of birth are collected semi-annually, the difference in the number between the first and last halves of the year is much less, and suggests the probability of incomplete collection of the occurrences of birth in localities where the collection is deferred to the commencement of the following year.

The percentages of the different quarters of the year 1880, were as follows: First quarter, 24.16; Second quarter, 23.55; Third quarter, 26.08; Fourth quarter, 26.21.

PARENTAGE.

By reference to Table I., page 2, in the division of births, there will be found the parentage of the children born in Rhode Island during the year 1880. It will be seen that of the whole number—6,295—there were 2,741 of American parentage, 2,555 foreign, and 999 of mixed parentage.

The following Table will show the parentage of the children born in the State, and the variations of the same from year to year, in each of the last five years, and also the number and variations occurring in four periods of five years each, from 1858 to 1877 inclusive.

Table XXIII.

PARENTAGE.	1880.	1879.	1878.	1877.	1876.	5 years. 1873 to 1877.	5 years. 1868 to 1872.	5 years. 1863 to 1867.	5 years. 1858 to 1862,
American	2,741	2,767	2,887	2,665	2,585	13,431	12,214	9,712	10,609
Foreign	2,555	2,573	2,848	2,642	2,873	13,990	12,366	9,968	9,697
Amer. father and For. mother.	417	442	463	416	354	11,782	1,353	876	814
For. father and Amer. mother.	582	568	516	512	517	2,357	1,720	941	755
Parentage not stated	......	......	......	... ..	.. ...	....	....	70	223
Total	6,295	6,350	6,714	6,235	6,329	31,560	27,653	21,567	22,098

The changes that have occurred in the proportions of the births in the different classes, during the period of twenty-three years, may be shown in a different, and perhaps clearer manner, by the following Table of *percentages:*

Table XXIV.

PARENTAGE.	1880.	1879.	1878.	1877.	1876.	5 years. 1873 to 1877.	5 years. 1868 to 1872.	5 years. 1863 to 1867.	5 years. 1858 to 1862.
American	43.55	43.57	43.00	42.74	40.84	42.55	44.17	45.18	48.50
Foreign	40.60	40.53	42.82	42 38	45.40	44.35	44.72	4637	44.33
Amer. father and For. mother.	6.62	6.96	6.35	6.67	5.59	5.84	4.89	4.07	3.72
For. father and Amer. mother.	9.23	8.94	7.83	8.21	8.17	7.26	6.22	4.38	3.45
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

The above Table is interesting as showing the changes that have occurred in Rhode Island, in regard to the proportions respectively of the children born of native and foreign born citizens, and of children born of parents of which one was native and the other foreign born.

It will be observed that during the period of five years, from 1858 to 1862 inclusive, the proportion of births of purely American parents was nearly one half of the whole number. It will also be observed that the proportion of births of children of the same parentage gradually lessened until in 1876, fourteen years thereafter, it was only 40.84 per cent. It then in the following year began to increase, and has so continued to the present time, the difference between the year 1879 and 1880, however, being exceedingly slight, a simple falling off of less than three hundredths of one per cent.

It will be seen also that the maximum proportion of births of children of purely foreign parentage occurred between 1863 and 1867, since which time, with slight exceptions, the proportion has gradually declined.

In 1863 the proportion of children born of foreign parentage was 46.79, the largest during the existence of the State.

In 1880 the proportion of the same was 40.60.

In the meantime the proportion of children born of American fathers and foreign mothers has increased from 3.72 per cent. in 1863, and in the average of five previous years, to 6.62 per cent. in 1880.

At the same time, and during the same period, the children born of foreign fathers and American mothers have increased from the proportion of 3.45 per cent. to 9.23 per cent.

Previous to 1863 the number of children born of mixed parentage was scarcely more than seven per cent. in any year. In 1879 the proportion of the same was 15.90 per cent., and in 1880 15.85 per cent.

It has been the custom, for several years past, to contrast the number and percentages of the children born in the different classes with the percentages according to population. But at the time of making up this Report the number of persons of foreign parentage in Rhode Island (not exclusively foreign born) had not been forwarded from the Census Bureau, at Washington.

COLORED CHILDREN.

The number of births of children of colored parentage reported for the year 1880 is 140. They are always included in the general statistics of births, but having some special importance as to the survival of the race, and other questions, they have had a separate consideration. The number is smaller by 19 than that of 1879, and smaller by 32 than that of 1878.

In regard to sex the numbers and proportions were as follows, viz.: Males, 75; females, 65; or 53.57 males and 46.43 females in every 100 births; or 115.4 males to each 100 females.

The towns reporting colored births in 1880, and the number in each, are as follows:

Bristol	4	Cranston	1	Smithfield	1
Coventry	1	East Providence	3	NorthKingstown	2
East Greenwich	4	Foster	1	South Kingstown	4
Warwick	6	Johnston	2	Richmond	3
Middletown	1	Lincoln	1	Providence City	87
Newport City	19				
		Total	140.		

The towns from which no returns of births of colored children were made for the year 1880 are as follows, viz.: Barrington, Warren, West Greenwich, Jamestown, Little Compton, New Shoreham, Portsmouth, Tiverton, Burrillville, Cumberland, Glocester, North Providence, North Smithfield, Pawtucket, Scituate, Woonsocket, Charlestown, Exeter, Hopkinton and Westerly.

The question of perpetuity of the colored race will be considered on another page, where mortality and the color of decedents is taken up.

NUMBER OF THE CHILD OF THE MOTHER IN THE ORDER OF BIRTH.

Something may be learned of the physical capacity of any people by a record of the number and percentage of the births among them, and the number of the child of each mother. Such records, however, can only afford general conclusions, as there are so many circumstances that may prevail to modify the number of births as a whole, and also the number born of each mother.

The following Table shows the number of the child of the mother: that is, how many of the children born were reported as the first, second, third, &c., of their respective mothers. The statistics on this subject begin with the year 1857, and the following Table includes the children reported in 1879, and in 1880, and also the total for twenty-four years, 1857 to 1880 inclusive:

TABLE XXV.

NUMBER OF THE CHILD OF THE MOTHER.	1879.	1880.	24 years. 1857-1880.
First	1,435	1,480	30,183
Second	1,194	1,123	24,804
Third	1,008	1,014	19,447
Fourth	809	770	14,607
Fifth	593	581	10,859
Sixth	427	439	7,866
Seventh	309	307	5.503
Eighth	221	211	3,748
Ninth	138	140	2,478
Tenth	77	93	1,612
Eleventh	53	74	933
Twelfth	37	26	561
Thirteenth	29	14	285
Fourteenth	10	13	145
Fifteenth	5	5	80
Sixteenth	4	5	42
Seventeenth	1	0	26
Eighteenth	0	0	7
Nineteenth	0	0	5
Twentieth	0	0	3
Twenty-first	0	0	3
Twenty-second	0	0	2
Total	6,350	6,295	123,199

It will be observed that there was a larger number of births in 1880 of the first child of the mother than in 1879, and the same was also true of the two years preceding 1879.

The proportionate number of the first children reported in 1880 was 23.50 in each 100 births. This proportion is smaller than the average of a quarter of a century of registration, which is about 24.50 in each 100 births.

There are in every year more or less births reported, in which the number of child of the mother is not given, and therefore the proportion of each cannot be given with entire exactness, neither does the number of births given in the above Table show the entire number of children born, because of the same reason.

The following Table shows what percentage of the children born in each of the last six years were the first, second, &c., children of the mothers, and also the average percentage of the same for a period of ten years, from 1868 to 1877 inclusive:

TABLE XXVI.

NUMBER OF THE CHILD.	1880.	1879.	1878.	1877.	1876.	1875.	10 years. From 1868 to 1877.
First	23.50	22.59	21.77	22.93	24.11	24.37	25.21
Second	17.84	18.80	20.26	20.98	20.63	20.80	20.65
Third	16.11	15.87	18.90	16.22	16.04	14.93	15.49
Fourth	12.24	12.74	12.32	12.09	12.00	11.78	11.37
Fifth	9.23	9.33	8.77	9.07	8.42	8.81	8.38
First to Fifth	78.92	79.33	82.02	81.29	81.20	80.69	81.10
Sixth and over	21.08	20.67	17.98	18.71	18.80	19.31	18.90
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

It will be seen by the above Table that the proportion of the second children of the mother, born in 1880, was not only smaller than in any one of the previous five years, but considerably smaller than the average of a period of thirteen years.

More or less variation is to be expected from year to year, but the difference between 17.84 per cent. in 1880 and the average of a considerable number of years (nearly three per cent), is, to say the least, quite unusual.

PLURALITY BIRTHS.

The statistics of plurality births in Rhode Island for 1880 may be found on page 6, Table III. It will be seen that there were fifty-three cases during the year; all of twins. The number of children was 106, of which 55 were males, and 51 were females.

Of the 53 cases, 25 were in Providence city; 15 in Providence county towns; 8 in Newport county; 4 in Bristol county, and one in Washington county.

The parentage of the same was as follows: of the cases 20 were of purely American; 20, Irish; 4, English; 2, Portuguese; one German, and 6 of mixed parentage, of which 2 were of American fathers, 3 of English fathers, and one of Irish father.

In regard to season, the numbers in the different months were as follows:

January	5	April	3	July	5	October	2
February	4	May	6	August	5	November	3
March	5	June	5	September	5	December	5
First quarter	14	Second quarter	14	Third quarter	15	Fourth quarter	19

Total .53.

The general statistics of births reported in Rhode Island during a period of twenty-eight years, that is, from 1853 to 1880 inclusive, are as follows:

133,102 cases of single births	giving	133,102 children.
1,416 cases of twin births	giving	2,832 children.
18 cases of triple births	giving	54 children.
134,536 cases of child-birth	giving	135,988 children.

Of the whole number of cases of child-birth (134,536) during the twenty-eight years, one in 95.0 produced twins, and one in 7,474 produced triplets.

Of the whole number of children born during the same period (135,988), ascertained from the reports, one in every 48 was a twin, and one in every 2,519 was a triplet.

Of the 1,416 cases of plurality births which have occurred in the State during the last twenty-eight years, there were 611 cases in which both parents were Americans; 674 cases in which both parents were foreign; 121 cases in which the parentage was mixed; that is, one American and one foreign parent; and 8 in which the parentage was not stated.

The whole number of children born in plurality cases during the twenty-eight years was 2,886, of whom 1,453 were males, and 1,429 were females; the sex of the remaining four was not given.

STILL–BORN CHILDREN.

The statistics in relation to still-born children, as stated in previous reports, are obtained from the returns of deaths, but are not numbered with, or in any way included in the statistics of deaths of this or previous reports.

For the reason that they occupy a somewhat anomalous position in the statistics of life and death, they are given a separate consideration.

The whole number of still-born children reported in Rhode Island for the year 1880 was 192; this is 24 less than for the year 1879, and 56 less than for 1878.

The following are the numbers reported from the different divisions of the State:

Bristol County	12	Providence County, Towns	37
Kent County	2	Providence City	121
Newport County, Towns	4	Washington County	4
Newport City	12	Whole State	192

There were fourteen towns from which no report of still-born children was received, 4 more than in 1879, and 5 more than in 1878.

Sex.—Of the 192 still-born children, 123 were males and 69 females.

Parentage.—Of the 192 births of this class, the parentage was divided as follows:

American parents	104
Foreign parents	88
Whole number	192

Color.—The divisions of the still-born children in respect to color were as follows:

White	180	Black	12

The number of colored still-born children was the same as in 1879 and in 1878.

Of the white still-born children there were 24 less than in 1879, and 44 less than in 1878.

Season.—The number of still-born children reported in each of the several months of 1880 was as follows:

January	20	May	12	September	12
February	18	June	18	October	14
March	15	July	16	November	21
April	17	August	9	December	20
Total	192				

SUMMARY OF STILL-BORN.

The following Table shows the number and sex of the still-born children whose births were reported in Rhode Island during the period from June 1, 1852, to December 31, 1880, and for each of the last five years:

TABLE XXVII.

SEX.	1880.	1879.	1878.	1877.	1876.	June 1, 1852, to Dec. 31, 1880.	Total.
Males	123	124	149	147	131	2,967	3,090
Females	69	92	99	95	92	1,982	2,051
Sex not stated	......	......	......	......	......	52	52
Total	192	216	248	242	223	5,001	5,193

It will be seen that the whole number of still-births reported in the State since June 1, 1852, is 5,193. Of the sex of this number, there were 3,090 males, 2,051 females, and of 52 the sex was not given. The ratio of occurrence, in regard to sex, would therefore be as follows: In each 100 children there were 60 males, and 40 females; or for every 100 females there were 150 males.

It will be seen that the proportion for the year 1880 varies somewhat from the average of a period of more than twenty-eight years. The proportion standing 178 males to each 100 females; or 64 males and 36 females in each 100. It is difficult to account for the great disproportion of the sexes of the still-born children.

Season of Still-births,—The following summary will show the number of still-births that have been reported in Rhode Island during a period of twenty-eight years, from 1853 to 1880 inclusive, with the months and quarters in which they occurred:

STILL-BORN—TWENTY-EIGHT YEARS—1853-1880. SEASON.

January	469	April	394	July	447	October	398
February	433	May	402	August	459	November	438
March	412	June	386	September	433	December	491
1st Quarter	1,314	2d Quarter	1,182	3d Quarter	1,339	4th Quarter	1,327

First six months, 2,496; second six months, 2,666; total, 5162.

It will be seen that with respect to season, the number of still-births in the aggregate of the different months and quarters in which they occurred during a period of twenty-eight years, did not vary greatly in the first, third and fourth quarters, the second quarter having about 10 per cent. less than the others. Of the different months December had about 12 per cent. more still-births than the general average.

PARENTAGE OF STILL-BORN.

Some interest has been heretofore manifested in regard to the parentage of the still-born. It is a question having some physiological importance, involving the changes that have occurred in the proportional number of the still-born of American and foreign origin, respectively, from year to year. Previous to 1859 the parentage of the still-born was not reported.

During the thirteen years from 1859 to 1871 inclusive, the whole number of still-births reported was 2,263, of which the parentage was as follows: American, 927; foreign, 1,334; unknown, 2.

The proportions were, therefore, 41.0 American and 59.0 foreign in each 100.

To show the changes that have occurred from year to year in the percentages of parentage of the still-born, in contrast with the percentages of the same nativities to the whole number of births, the following resumé is presented :

	Of Whole No. Births.				Of Whole No. Still-born.			
Years.	American.		Foreign.		American.		Foreign.	
1871	49.36	and	50.64	in each 100	41.00	and	59.00	in each 100.
1872	47.59	and	52.41	in each 100	41.25	and	58.75	in each 100.
1873	50.30	and	49.70	in each 100	59.21	and	40.79	in each 100.
1874	47.14	and	52.86	in each 100	50.00	and	50.00	in each 100.
1875	47.88	and	52.12	in each 100	49.19	and	50.81	in each 100.
1876	46.43	and	53.57	in each 100	45.76	and	54.24	in each 100.
1877	49.41	and	51.59	in each 100	53.31	and	46.69	in each 100.
1878	49.35	and	50.65	in each 100	55.65	and	44.35	in each 100.
1879	50.53	and	49.47	in each 100	54.63	and	45.37	in each 100.
1880	50.17	and	49.83	in each 100	54.16	and	45.84	in each 100.
15 years.								
1858–1872	50.54	and	49.46	in each 100	41.25	and	58.75	in each 100.
7 years.								
1873–1879	48.57	and	51.43	in each 100	52.55	and	47.45	in each 100.

MARRIAGES, 1880.

The number of marriages reported in Rhode Island during the year 1880 was 2,769. This number was 373 more than in 1879, and 445 more than in 1878.

The general statistics of marriages in 1880, in relation to season and number in the different divisions of the State, may be found in Table IV., on the seventh page.

SEASON.

The number and percentage of marriages in Rhode Island, in each quarter of the year 1880, may be found in the following Table, together with the aggregate number and percentage in each quarter for the twenty-seven years previous, viz., from 1853 to 1879 inclusive:

TABLE XXVIII.

YEARS.		First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Whole Year.
1880............	Number..........	574	705	630	860	2,769
	Percentage.......	20.73	25.46	22.75	31.06	100.00
27 Years.	Number..........	11,862	13,111	12,546	15,714	53,233
1853-1879..... ..	Percentage.	22.28	24.62	23.57	29.53	100.00

It has happened with scarcely an exception during the whole period of registration in Rhode Island, that the largest number of marriages in any quarter of the year have been in the last quarter, and the smallest number in the first quarter.

It will be seen that the difference in percentage between the first and last quarters of 1880 is larger than the average of twenty-seven years, and that the percentages of first and third quarters of 1880 are smaller, and the second and fourth are larger than the average of the long period.

NATIVITY OF PERSONS MARRIED.

The following Table shows the number of marriages, according to the nativity of the parties, for each of the last eight years, and also for the aggregate of twenty years, from 1858 to 1877 inclusive:

TABLE XXIX.

BIRTH-PLACE.	1880.	1879.	1878.	1877.	1876.	1875.	1874.	1873.	20 years. 1858–77. Total.
United States	1,775	1,511	1,455	1,407	1,402	1,467	1,495	1,620	25,674
Foreign Countries	548	467	493	496	513	614	695	702	10,963
American groom, foreign bride	202	209	181	177	144	191	154	138	2,410
Foreign groom, American bride	244	209	195	202	194	213	197	170	2,750
Not stated	......	......	......	......	......	......	......	......	64
Total	2,769	2,396	2,324	2,282	2,253	2,485	2,541	2,630	41,861

There was not only a larger number of marriages in 1880 in all classes taken together, but also a considerable increase in each of the several classes, except that of American groom and foreign bride.

In the class of foreign born the number is larger than in any year since 1875.

During the last two or three years there has been a considerable accession to the population of the State, of immigrants of usual marriageable age, from Germany, Sweden and Canada. These, in addition to the ordinary number from other foreign countries, have increased the number of marriageable persons of that class, and as the inclination to assume the marriage relation is more readily indulged by persons of foreign birth than of native birth, the number of marriages of that class has correspondingly increased.

For several years previous to 1880 the number of marriages in the class of foreign birth had gradually grown smaller, by reason of lessened immigration and the ordinary casualties of life.

The increase in number in 1880 will hardly be held for any lengthy period, and the increased proportion which, as will be seen in Table XXX. is only three tenths of one per cent., will doubtless decrease from year to year, as it has done for many years past with scarcely an exception.

It will be understood that in considering the proportion of marriages in the class of foreign born, the marriages of persons born in the United States of foreign parentage are not included.

It will therefore be perceived that the proportion of marriages of persons native born, including those born of foreign parentage and of American parentage, must inevitably increase.

The number of marriages in the class of mixed parentage, that is, where one of the parties was native born and the other foreign born, is also larger than in any previous year, although the proportion to the whole number, as may be seen in Table XXX., is less than in any year since 1876.

The class of mixed marriages in which the groom was foreign born and the bride American, has as usual a larger proportion than that where the groom was American and bride foreign born.

In the following Table are given the percentages of American, foreign and mixed marriages in each of the last six years, and in the aggregate for the twenty years, 1858 to 1877 inclusive. By *mixed* marriages are meant those where one party was of American and the other of foreign birth :

TABLE XXX.

BIRTH-PLACE.	1880.	1879.	1878.	1877.	1876.	1875.	20 years. Total.
United States	64.10	63.06	62.60	61.66	62.23	59.04	61.33
Foreign Countries	19.79	19.49	21.22	21.73	22.77	24.70	26.19
Mixed	16.11	17.45	16.18	16.61	15.00	16.26	12.48
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00

The proportion of marriages of persons native born in 1880 was larger than in any one of the last fifteen years, and also larger than the average annual proportion of a period of twenty-three years.

And this proportion, as previously remarked, must continue to increase as all those born in the United States, whether of American or foreign parentage, are classed as Americans in the marriage statistics.

AGES OF PERSONS MARRIED.

The number of persons married in Rhode Island during the year 1880, in the different periods of life, is shown in Table V. on page 8. The number of each sex, in each division of age, can also be found in the following Table :

TABLE XXXI.

1880.	Under 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 to 60.	60 to 65.	65 to 70.	70 to 75.	75 to 80.	80 to 85.	85 to 90.	Not stated
Males	102	1,077	764	345	206	97	64	52	24	18	13	3	3	1	....	....
Females	586	1,224	498	211	123	66	27	13	9	9	2	...	....	....	...	1
Total	688	2,301	1,262	556	329	163	91	65	33	27	15	3	3	1	...	1

The marriage statistics of every year show more or less couples assuming the marital relation, with very considerable disparities of age between the contracting parties.

Table V., on the eighth page, presents some of these curious alliances.

It will there be seen that ten men between 35 and 40, and four men between 40 and 45, took young brides under 20 years of age; three grooms from 60 to 65 took brides from 20 to 25; and one from 75 to 80 took a bride between 30 and 35 years of age.

Public sentiment, however, accepts and in some measure approves a considerably more advanced age in the groom as compared with the bride, and hence the larger number of marriages in which the groom is the senior of the bride by more or less years. When, therefore, there is a considerable disparity in the ages of the parties to a marriage contract, and that disparity is in the more advanced age of the bride, it is a matter of greater public comment and wonder, and of less frequent occurrence.

During the year 1880 three women between 35 and 40 took husbands between 20 and 25; one bride between 55 and 60 took a husband between 35 and 40; and one bride between 60 and 65 took a groom between 40 and 45 years of age.

The following table shows the number of persons married in Rhode Island, including both sexes, in each division of ages, in each of the last fifteen years, from 1866 to 1880 inclusive :

TABLE XXXII.

YEARS.	Under 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 to 60.	60 to 65	65 to 70.	70 to 75.	75 to 80.	80 to 85.	85 to 90.	Not stated.
1866	693	1,931	1,025	419	213	127	81	59	25	21	12	7	....	...	....	23
1867	696	1,886	1,104	416	211	148	91	48	37	18	18	5	3	1	....	6
1868	644	1,835	1,050	432	219	133	82	61	30	29	11	8	4	. ..	....	32
1869	642	1,814	1,051	468	227	134	79	46	35	15	11	2	3	2	....	49
1870	744	1,883	1,084	415	216	159	86	64	26	24	12	3	2	....	...	6
1871	697	1,914	1,118	392	228	115	73	56	35	22	6	7	3	....	....	6
1872	786	2,073	1,182	434	237	131	81	61	43	21	13	6	1	. ..	....	5
1873	762	2,177	1,156	507	253	140	87	68	35	24	12	6	6	....	....	27
1874	770	1,992	1,179	459	268	159	101	52	36	39	8	9	1	....	....	9
1875	681	2,058	1,108	475	252	150	101	60	32	29	13	4	1	....	....	6
1876	691	1,741	1,041	450	224	154	80	53	27	19	12	3	2	...	....	9
1877	631	1,745	1,118	459	244	125	92	52	46	14	15	11	2	1	...	9
1878	618	1,832	1,123	441	259	162	74	49	39	20	17	2	4	....	...	8
1879	639	1,879	1,156	481	272	123	78	56	39	26	18	9	2	2	1	11
1880	688	2,301	1,262	556	329	163	91	65	33	27	15	3	3	1	...	1

The proportion to the whole number of persons married in 1880, of those under 20 years of age was 12.42 per cent. In 1879 the proportion was 13.33 per cent.; in 1878, 13.30 per cent.: in 1872, 15.49 per cent. There has been a gradual diminution from year to year, with only exceptions enough to prove the rule, of the proportion of persons entering the marriage state under 20 years of age.

In all the periods of life between 20 and 45 the number of marriages in 1880 was larger than ever before recorded. The relative proportions of the sexes in the different ages will be given below.

PROPORTION OF SEX.

The following Tables will show the percentages of males and females married, in each division of ages, in each of the last twenty-one years:

TABLE XXXIII.

	YEARS.	Under 20.	20 to 25.	25 to 30.	30 to 40.	40 to 50.	50 & over.	Total.
MALES.	1860	5.0	42.8	26.9	16.3	5.7	3.3	109.00
	1861	4.6	44.5	25.4	15.5	5.8	4.2	100.00
	1862	4.2	37.8	27.9	18.3	5.9	5.9	100.00
	1863	3.5	38.0	29.6	17.2	5.8	5.9	100.00
	1864	4.3	38.8	27.3	17.9	7.4	4.3	100.00
	1865	3.5	37.0	28.4	18.9	7.5	4.7	100.00
	1866	5.3	40.9	27.0	16.4	6.3	4.1	100.00
	1867	4.3	40.1	27.9	16.8	6.8	4.1	100.00
	1868	4.1	39.9	28.2	17.1	6.1	4.6	100.00
	1869	4.3	39.6	27.7	18.5	6.1	3.8	100.00
	1870	4.8	40.4	28.1	16.0	6.4	4.3	100.00
	1871	5.3	40.1	28.9	16.5	4.9	4.3	100.00
	1872	4.3	41.3	28.2	16 6	5.2	4.4	100.00
	1873	3.8	42.4	26.7	17.0	6.0	4.1	100.00
	1874	4.1	40.4	27.2	17.5	6.4	4.4	100.00
	1875	3.5	40.9	27.8	17.5	6.1	4.2	100.00
	1876	5.1	37.5	28.6	17.9	5.6	4.3	100.00
	1877	4.3	36.0	30.2	18.7	5.9	4.9	100.00
	1878	3.9	38.5	29.0	18.0	6.3	4.3	100 00
	1879	3.9	37.8	28.8	19.3	5.4	4.8	100.00
	1880	3.6	38.9	27.5	19.9	5.8	4.3	100.00

TABLE XXXIV.

	YEARS.	Under 20.	20 to 25.	25 to 30.	30 to 40.	40 to 50.	50 & over.	Total.
FEMALES.	1860	25 8	44.1	17.0	9.1	2 6	1.4	100.00
	1861	29.6	42.0	15.2	7.8	4.1	1.3	100 00
	1862	24.9	41.3	16.7	11.8	4.1	1.2	100.00
	1863	24.9	42.6	16.9	9.8	4.1	1.7	100.00
	1864	24.2	43.4	17.8	10.3	2.9	1.4	100.00
	1865	22.6	42.3	19.1	11.0	3.5	1.5	100 00
	1866	24.7	42.9	17.4	11.0	2.7	1.3	100.00
	1867	25.4	40.5	19.3	10.0	3.4	1.4	100.00
	1868	24.4	40.9	18.1	11.6	3.3	1.7	100.00
	1869	24.1	40.5	18.7	12.1	3.4	1.2	100 00
	1870	26.8	39.4	17.9	10.8	3.9	1.2	100.00
	1871	24.6	41.9	19.1	10.1	3.1	1.2	100.00
	1872	26.7	40.5	18.4	9.9	3.2	1.3	100.00
	1873	25.3	40.8	17.5	12.0	2.7	1.7	100.00
	1874	26.3	38.1	19.3	11.1	3.9	1.3	100.00
	1875	23.9	42.1	16.8	11.8	4.0	1.4	100.00
	1876	25.6	39 8	17.6	12 0	3.7	1.3	100.00
	1877	23.4	40.4	18.8	12.1	3.6	1.7	100.00
	1878	22.7	40.4	19.3	12.2	3.8	1.6	100.00
	1879	22.8	40.7	19.4	12.1	3.0	2.0	100.00
	1880	21.1	44.2	18.0	12.0	3.3	1.4	100.00

It will be seen by the preceding Tables that the percentage of marriage of persons under 20 years of age, of both sexes, is considerably less than the average of the last twenty-one years, that the proportion of females under 20 is less than in any one of the twenty-one years, and with the exception of 1875, the same may be said of males under 20 entering the marriage state.

The annual average of marriages of the male sex under 20 for twenty years, 1860 to 1880, was 4.3 per cent.

The annual average of marriages of females under 20, during the same period was 25.83 per cent.

Of persons of 50 years of age and over, who enter the marriage state, the proportion to the whole number married is very small. Of males the average annual proportion during a period of twenty years was less than four and one half persons in each one hundred, and of females the average proportion for the same period was less than one and one half persons in each one hundred married.

COLORED MARRIAGES.

The number of marriages of persons of color in Rhode Island during the year 1880 was 76. This number is 15 more than in 1879, and 4 less than in 1878. The increase has been largely in the city of Providence.

The following summary will show what the proportion of colored persons married during each of the five years from 1876 to 1880 inclusive, bears to the whole number of colored persons in the State; and also a comparison of these several proportions with the proportions which the whole number of persons married in each of the same years, bears to the whole population of the State.

	1880. One in every	1879. One in every	1878. One in every	1877. One in every	1876. One in every
Ratio of colored persons married to whole of colored population of the State.	43.3	51.4	39.1	49.0	53.1
Ratio of whole number of persons married to whole population of the State.	50.0	57.8	55.7	56.6	57.3

It will be perceived that marriages of the colored race have uniformly been of larger proportions than of the white, and that the fluctuations of the proportion from year to year have also been greater in the colored race.

DIVORCES, 1880.

The number of applications for divorce reported from the different counties in Rhode Island in 1880 was 347. This number is 92 more than in 1879, and 89 more than in 1878.

During the year 1880, there were 273 applications for divorce granted, which were 27 more than in 1879, and 77 more than in 1878.

The following Table shows the number of applications for divorce, and the number granted, in 1880, in each county of the State; also the causes alleged for the applications. Full reliance cannot be placed in the causes alleged, the real causes no doubt being sometimes withheld:

TABLE XXXV.

COUNTIES.	Number of Applications.	Number Granted.	Causes Alleged.						
			Adultery.	Extreme Cruelty.	Wilful Desertion.	Continued Drunkenness.	Neglect to Provide Necessaries, &c.	Other Gross Misbehavior.	Impotency.
Bristol	10	8	3	2	7	2	5	5	......
Kent	28	23	5	2	6	2	13	......	......
Newport	21	11	9	1	6	1	8	......	......
Providence	250	208	40	65	158	64	178	39	1
Washington	38	23	6	6	11	4	11	8	......
Whole State	347	273	63	76	188	73	215	52	1

There are several different reasons alleged why divorce should be granted, in nearly every application. It will be noticed that the causes alleged in 347 applications in 1880, numbered 668. Of the 668 causes alleged 63 were for adultery; 76 for extreme cruelty; 188 for wilful desertion; 73 for continued drunkenness; 215 for neglect to provide necessaries of life; 52 for other gross misbehavior; and one for impotency.

There are every year applications or petitions for divorce which are not acted upon or continued until the case is closed, but are refused or granted in some following year.

In order to show the actual number of applications, and the number of divorces granted in each of the last eight years, the following summary is presented:

	Applications for Divorce.	Divorces Granted.	Applications refused or continued or withdrawn.
1873	261	173	88
1874	276	242	34
1875	227	158	69
1876	254	196	58
1877	257	178	79
1878	258	196	62
1879	255	246	9
1880	347	273	74
8 years total	2,135	1,662	473

The proportion of the number of divorces granted during the year 1880, to the number of applications for a decree of divorce was 78.6 per cent. This proportion is rather larger than the average of a series of years.

The number of applications for divorce in 1880 was an excessive increase over that of any preceding year.

The ratio of applications to the whole number of marriages during the year, was one application for divorce to less than every eight marriages.

The following Table shows the number of divorces granted in each county, and in the whole State, in each of the last twelve years, with the proportion of marriages to each divorce granted in each year:

Table XXXVI.

YEARS.	Bristol County.		Kent County.		Newport County.		Providence. County.		Washington County.		Whole State.	
	Divorces Granted.	Marriages to one Divorce.	Divorces Granted.	Marriages to one Divorce.	Divorces Granted.	Marriages to one Divorce.	Divorces Granted.	Marriages to one Divorce.	Divorces Granted.	Marriages to one Divorce	Divorces Granted.	Marriages to one Divorce.
1869	10	10.6	15	12.5	6	27.7	120	13.8	11	15.5	162	14 1
1870	3	27.7	18	11.8	6	26.3	152	11 3	21	9.3	200	11.8
1871	5	16.8	11	17.9	4	49.7	123	13.3	18	11.4	161	14.5
1872	8	10.2	13	15.7	8	22.9	149	12.6	22	8.9	200	12.7
1873	6	16.2	22	9.8	8	21.9	131	14.8	6	33.7	173	15.2
1874	10	8.9	20	8.0	6	29.0	190	10.0	16	11.6	242	10.5
1875	2	50.0	18	8.8	7	23.4	120	14.9	11	20.5	158	15.7
1876	6	14.5	15	12.8	7	20.5	148	11.1	20	8.8	190	11.5
1877	7	12.0	9	16.3	7	26.0	134	12.4	21	9.9	178	12.8
1878	4	26.0	11	13.3	13	12.8	156	10.9	12	17.3	196	11.9
1879	5	18.8	19	9.0	7	24.1	195	9.1	20	9.7	246	9.7
1880	8	12.1	23	9.4	11	17.6	208	9.7	23	17.0	273	10.1

It will be seen that the proportions of divorces granted to number of marriages, have varied very considerably in the different counties in the same year, and in the same county in different years. In Bristol county the proportion in 1874 was one divorce to every 8.9 marriages, and in the following year one divorce to every 50 marriages.

Newport county has had the smallest average proportion of any county in the State. During the last two years the proportions have been the largest in Kent county of any county in the State.

The proportion of divorces granted to whole number of marriages in the State, was slightly less in 1880 than in the previous year.

DEATHS, 1880.

The number of deaths reported to the State Registrar as having occurred during the year 1880 was 4,829. It is much the largest number ever reported in the State. It exceeds that of 1879 by 357, and is larger than the number reported in 1878 by 388.

The rate of mortality as shown in the recapitulatory Table on page 14, was 17.5 decedents in each 1000 of the population, or one in every 57.2 persons. The rate is about one eighth of one per cent. larger than that of 1879.

It has been the practice in previous reports to contrast the number of deaths in the city of Providence with those that occurred in the rest of the State, for the purpose of showing the difference in the rate of mortality between city life under favorable circumstances, and life in villages and rural districts.

In order to bring before the eye in a more direct manner the comparisons alluded to, the following synopsis for the years 1878, 1879 and 1880 is presented:

		Population.	Number of Deaths.	One death in every	In each 1000.
1878.	Providence City	100,675	1,989	50.62	19.89
	Rest of State	157,564	2,452	64.26	15.56
	Whole State	258,239	4,441	58.10	17.20
1879.	Providence City	104,857	2,026	51.76	19.32
	Rest of State	171,848	2,446	70.25	14.02
	Whole State	276,531	4,472	61.87	16.20
1880.	Providence City	104,857	2,080	50.41	19.83
	Rest of State	171,674	2,749	62.45	16.00
	Whole State	276,531	4,829	57.26	17.50

The calculations for the years 1879 and 1880 are made on the basis of the revised census of 1880.

Upon a comparison of the different years, it will be seen that the difference in the death rates of Providence city and the rest of the State, in 1880, was less than in either of the two preceding years. In 1878 it was 4.33 in each thousand; in 1879, 5.30; and in 1880 3.83 in each thousand of the population.

The figures do not indicate that the conditions of living in the city of Providence, are greatly more unfavorable to continuance of life than in the rest of the State.

SEX OF DECEDENTS.

Of the 4,829 persons whose deaths were returned during the year 1880, 2,366 were males, and 2,463 were females; the ratio standing at 96.06 males to each 100 females, or 48.96 males, and 51.04 females in each 100 decedents.

The following Tables, XXXVII. and XXXVIII., show the number and proportion of males and females among the decedents, and also among the children born in Rhode Island, during the ten years, 1853 to 1862 inclusive; also in each of the eighteen years from 1863 to 1880 inclusive, and for the entire period of twenty-eight years:

TABLE XXXVII.

DEATHS.	10 years, 1853–1862	10,930 males	11,269 females	or 96.9 males to 100 females.
	1863	1,621 males	1,586 females	or 102.2 males to 100 females.
	1864	1,633 males	1,727 females	or 94.5 males to 100 females.
	1865	1,686 males	1,719 females	or 98.1 males to 100 females.
	1866	1,497 males	1,473 females	or 101.6 males to 100 females.
	1867	1,442 males	1,447 females	or 99.7 males to 100 females.
	1868	1,413 males	1,499 females	or 94.3 males to 100 females.
	1869	1,696 males	1,686 females	or 100.6 males to 100 females.
	1870	1,588 males	1,650 females	or 96.2 males to 100 females.
	1871	1,621 males	1,723 females	or 94.1 males to 100 females.
	1872	2,118 males	2.129 females	or 99.4 males to 100 females.
	1873	2,166 males	2,237 females	or 95.5 males to 100 females.
	1874	2,111 males	2,118 females	or 99.7 males to 100 females.
	1875	2,108 males	2,209 females	or 95.4 males to 100 females.
	1876	1,969 males	2,147 females	or 91.7 males to 100 females.
	1877	2,132 males	2,318 females	or 92.0 males to 100 females.
	1878	2,161 males	2,280 females	or 94.8 males to 100 females.
	1879	2,183 males	2,289 females	or 95.4 males to 100 females.
	1880	2,366 males	2,463 females	or 96 0 males to 100 females.
	28 years	44,441 males	45,969 females	or 96.7 males to 100 females.

TABLE XXXVIII.

BIRTHS.	10 years, 1853-1862	18,377 males	17,260 females	or 106.4 males to 100 females.
	1863	1,892 males	1,788 females	or 105.8 males to 100 females.
	1864	1,949 males	1,942 females	or 100.3 males to 100 females.
	1865	2,096 males	1,857 females	or 112.9 males to 100 females.
	1866	2,546 males	2,356 females	or 108.1 males to 100 females.
	1867	2,655 males	2,464 females	or 107.7 males to 100 females.
	1868	2,745 males	2,627 females	or 104.5 males to 100 females.
	1869	2,685 males	2,560 females	or 104.9 males to 100 females.
	1870	2,679 males	2,536 females	or 105.6 males to 100 females.
	1871	2,878 males	2,800 females	or 102.8 males to 100 females.
	1872	3,085 males	3,058 females	or 100.9 males to 100 females.
	1873	3,135 males	2,887 females	or 108.6 males to 100 females.
	1874	3,311 males	3,155 females	or 104.9 males to 100 females.
	1875	3,362 males	3,146 females	or 106.9 males to 100 females.
	1876	3,291 males	3,038 females	or 108.3 males to 100 females.
	1877	3,163 males	3,072 females	or 103.0 males to 100 females.
	1878	3,402 males	3,312 females	or 102.7 males to 100 females.
	1879	3,259 males	3,091 females	or 105.4 males to 100 females.
	1880	3,241 males	3,054 females	or 106.1 males to 100 females.
	28 years	69,751 males	66,003 females	or 105.7 males to 100 females.

An inspection of Table XXXVII. will show that during a period of ten years previous to 1863, the number of female decedents exceeded the male decedents by about an average of three per cent. each year, and that during the eighteen following years the rule then apparently established has held good, the expeptions being simply confirmatory, the average only being slightly less.

But at the same time that the records of death have shown an excess of mortality in the female sex, the records of birth have shown an excess of births of the male sex.

This would naturally lead to the supposition that the number of the male sex must be increasing and *vice versa.*

By reference to Table VII., on page 14, it will be seen that by the census of 1880 the population of the State by the sexes was as follows:

Males	133,030	Females	143,501

This will show an excess of 10,471 females in the general population.

It is obvious that there is either a larger proportional immigration of females, or a larger proportional emigration of native males from the State, to account for the difference. Probably the fact. is the result of both circumstances.

The excess of female population would account for the excess of mortality in numbers of the female sex.

SEASON AND MORTALITY.

The whole number of decedents, and the sex of the same, in each month of the year 1880, and in each division of the State, may be found in Table VI., on the ninth page.

The influence of season upon mortality may be further illustrated by the following Table, which shows the number and percentage of deaths in each quarter of each of the last five years, and in the aggregate for the twenty-five years from 1853 to 1877 inclusive:

TABLE XXXIX.

SEASON.	1880.		1879.		1878.		1877.		1876.		1853-1877.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
January-March....	1,216	25.18	1,185	26.49	1,158	25 87	936	21.03	948	23.03	17,646	22.16
April-June........	1,149	23.80	939	20.99	968	21.81	958	21.53	942	22.89	16,513	20 74
July-September...	1,306	27.04	1,174	26.26	1,175	26.46	1,317	29.60	1,249	30.34	23,464	29.46
October-December	1,158	23.98	1,174	26.26	1,140	25.86	1,239	27.84	977	23 74	22,006	27.64
Total....	4,829	100.00	4,472	100.00	4,441	100.00	4,450	100.00	4,116	100.00	79,629	100.00

The percentages of the different quarters of the year 1880, vary considerably from the corresponding quarters of 1879. The mortality of the first quarter of 1879 was the largest in the year, contrary to the rule established by twenty-eight years of registration. The first quarter has in nearly every year, been the third in the percentage of mortality, but in 1880 it holds the second place. The percentage of the first two quarters in 1880 is considerably more than the yearly average of a period of twenty-five years, and that of the last two quarters considerably less than the yearly average of the same period.

The question of the influences of city life upon the status of mortality is often presented, and it has been the custom in former Reports to contrast the city of Providence, which comprises about three-eighths of the entire population of the State, with the rest of the State, in regard to the influence of *season* upon mortality.

The following Table will present a comparison between the city and the rest of the State, in relation to the mortality of each section by seasons. It will show the number and percentage of deaths in each quarter of the year 1880 in the city, and in the rest of the State separately; and also the percentage of deaths in each quarter of the year in the city of Providence, for twenty-five years, from 1855 to 1879 inclusive; and in the whole State, including the city, for twenty-seven years, from 1853 to 1879 inclusive:

TABLE XL.

SEASON.	1880.				1855-1879.		1853-1879.	
	Providence.		Rest of State.		Providence.		Whole State.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
January-March....	560	26.92	656	23.86	8,033	23.99	20,120	24.55
April-June.	533	25.63	616	22.04	7,348	21.94	18,630	21.59
July-September	525	25.24	781	28.41	9,846	29.40	25,945	30.17
October-December.....	462	22.21	696	25.69	8,263	24.67	21,304	23.69
Total.....................	2,080	100.00	2,749	100.00	33,490	100.00	85,999	100.00

Contrary to the rule established by twenty-five years registration in the city of Providence, the percentage of the first quarter of the year 1880 was the largest in the year. The third quarter, which is usually the largest in percentage of mortality, as before observed, was smaller than either the first or second. The great prevalence and severe form of an epidemic of scarlatina during the early months of the year, doubtless contributed largely to that result.

In the rest of the State, the prevailing order of a long period of years was sustained.

The difference in percentage of mortality between the city and the rest of the State, in each of the different quarters of the year 1880, as will be noticed, are quite considerable, varying more than three per cent. in the first, third and fourth quarters.

ORDER OF MONTHS.

Below may be found a general view of the order of the months, in which occurred from the largest to the smallest number of deaths, in the whole State, in each of the last five years:

TABLE XLI.

1880.		1879.		1878.		1877.		1876.	
1. July	488	January	468	December	421	September	454	August	469
2. August	430	August	452	August	420	August	450	July	444
3. March	426	December	395	July	410	October	430	December	348
4. January	422	October	391	January	400	July	413	March	341
5. October	416	November	388	March	396	December	411	September	336
6. April	400	July	383	November	377	November	398	October	334
7. May	392	March	382	February	362	March	347	May	332
8. September	388	April	342	April	350	May	343	April	329
9. December	377	September	339	September	345	January	323	February	312
10. February	368	February	335	October	342	April	310	January	295
11. November	365	May	318	June	310	June	305	November	295
12. June	357	June	279	May	308	February	266	June	281
	4,829		4,472		4.441		4,450		4,116

It will gratify the curiosity of those having a fondness for studying the fluctuations of the death rate in the different months of the year, to observe their occurrence as shown in Table XLI. August, which for a long period was the first in the order of largest mortality, has fallen to the second place in the list during the last four years. June is the only month in the year which has sustained its place on the list without large change.

PARENTAGE OF DECEDENTS.

The whole number of decedents reported in Rhode Island in 1880 was 4,829, of which 2,517 were of American parentage, and 2,312 were of foreign parentage. The parentage was reckoned according to the reported nativity of the fathers.

The parentage of the decedents in the two classes of American and foreign, as reported from the different towns in the State, may be found in the general abstract for 1880, on the second and third pages.

There were no decedents of foreign parentage, in 1880, reported from the following seven towns, viz.: West Greenwich, Jamestown, Little Compton, Middletown, New Shoreham, Foster and Charlestown.

The decedents of foreign parentage in the following six towns, numbered four or less, viz.: Barrington, Coventry, Portsmouth, Exeter, Hopkinton and Richmond.

The towns in which the number of decedents of foreign parentage exceeded those of American parentage, were as follows, viz.: Burrillville, Cranston, Cumberland, Lincoln, North Providence, North Smithfield, Pawtucket, Woonsocket and Providence.

In Cumberland there were nearly twice as many decedents of foreign parentage reported as there were of American; in Woonsocket nearly three times as many; and in Lincoln more than three times as many.

The following Table gives the number and percentage of decedents of American and of foreign parentage, in each of the last five years; and in the aggregate for twenty-two years, or from 1858 to 1879 inclusive:

Table XLII.

PARENTAGE.	1880.		1879.		1878.		1877.		1876.		1858–1879.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
American........ .	2,517	52.13	2,294	51.29	2,281	51.36	2,279	51.21	2,150	52.24	52,332	56 25
Foreign	2,312	47.87	2,178	48.71	2,160	48.64	2,171	48.79	1,966	47.76	40,702	43.75
Total....	4,829	100 00	4,472	100.00	4,441	100.00	4,450	100.00	4,116	100.00	93,034	100.00

It will be seen by Table XLII., that the decedents of American parentage have been steadily losing in the proportion to the whole number, from year to year, until in 1880 there was a slight gain, not reaching one per cent.

On the other hand, the decedents of foreign parentage have been steadily increasing in percentage as well as numbers, except as just stated.

Previous to 1874, the percentage of decedents of foreign parentage had averaged, during a period of seventeen years, less than 41.00 per cent. An examination of the above Table will show that the average proportion of the same parentage during the last four years, is 48.5 per cent. The proportional average of decedents of American parentage, during the same four years, is 51.5 per cent., while the average of decedents of the same parentage, during a period of seventeen years previous to 1874, was 58.28 per cent.

It should be borne in mind that the term "foreign parentage," as made use of above, does not mean that the decedents were all foreign born, but includes the foreign born, and all those whose fathers were of foreign birth, though of themselves American born.

It will thus be seen that as the population by foreign parentage increases, the death rate must also increase. But the percentage of mortality, under the term "foreign parentage," must, in a few years, decline, because the children born in the United States of foreign parents are rapidly reaching the adult age, and as they become parents, their children will be classed as of American parentage.

AGE OF DECEDENTS.

There may be found on pages two and three, in Table I., the aggregate and average age of all the decedents of each sex, in each town and county in the State.

There may also be found in Table VII., pages ten to fifteen inclusive, the number of each sex in each division of ages or periods of life, as reported from each town and county during 1880.

It will be seen by Table I. that the average age of all the male decedents in the State, in 1880, was 29.62 years; and the average age of all the female decedents during the same year was 32.06 years. The average age of both sexes was less than in 1879, and larger than in 1878, as will be seen in the following summary of the three years:

	1880.	1879.	1878.
	Average.	Average.	Average.
Males	29.62 years	31.29 years	29.02 years.
Females	32.06 years	33 24 years	31.11 years.
Age of all	30.86 years	32.29 years	30.00 years.

The highest average age of male decedents in any town in the State, in 1880, was 82 years, in New Shoreham; the highest average age of female decedents was 58.62 years, in Middletown

The lowest average age of male decedents during the same time was 16.38 years, in Lincoln, and the lowest average age of female decedents was 18.64 years, in Woonsocket.

The fallacy of dependence on the average age of decedents reported from any town of small population in single years, has been adverted to in previous Reports, and will be readily apparent to any one upon a moment's attention.

When, however, the results of a series of years are aggregated and averages made, a basis is obtained for approximate conclusions as to the relative longevity of the inhabitants of any town furnishing such statistics.

The aggregate and average age of all the decedents in each town and county in the State, for a period of ten years, will be seen in Table XV.

The larger the population of any town, the nearer the approximation of the average age of all its decedents in each and every year, to the average age of all the decedents in the State.

The following summary will show the average age of the decedents in the city of Providence, during 1878, 1879 and 1880:

	1880. Average.	1879. Average.	1878. Average.
Males	28.72	28.09	24.22
Females	30.45	29.54	27.88
Age of all	29.67	28.82	26.09

The following Table shows the average age of the decedents in each of the larger divisions of the State, in each of the last five years, and also in the aggregate of each of four periods of five years each, comprising the twenty years from 1858 to 1877 inclusive:

TABLE XLIII.

DIVISIONS OF THE STATE.	1880.	1879.	1878.	1877.	1876.	1873–1877. 5 years.	1868–1872. 5 years.	1863–1867. 5 years.	1858–1862. 5 years·
Bristol County.... ...	36.43	40.87	29.08	32.19	39.53	33.61	35.12	34.78	35.56
Kent County.........	36.54	35.15	33.68	35.78	39.39	36.20	34.77	35.81	32.15
Newport County......	42.38	37.62	39.06	43.96	39.17	40.68	40.04	33.54	35.01
ProvidenceCo.,Towns.	27.40	32.45	30.98	28.16	31.69	28.46	25.26	29.16	28.41
Providence City.......	29.67	28.82	26.09	27.74	28.41	27.19	25.45	28.50	25.78
Washington County...	37.82	43.44	42.34	43.68	43.09	41.14	39.67	30.87	34.21
Whole State	30.86	32.29	30.09	30.45	32.37	30.28	31.66	30.75	29.42

By the above it appears Bristol county has lost the high average age it showed in 1879, and steps back nearer the average of a series of years. Newport county shows a higher average, and also Providence city. Washington county has almost invariably shown the highest average of any section of the State, but is now surpassed by Newport county.

The average age of all the decedents in the State, in 1880, is somewhat less than in 1879. It is, however, more nearly the general average of a considerable number of years.

PERCENTAGES OF DECEDENTS AT DIFFERENT AGES.

In Table VII., on pages 10 to 15 inclusive, will be found the number of deaths in 1880, in each town and each county, of each sex, and in each period of life, with the percentage of the whole number of deaths in each division to the population of the same.

The following Table shows the percentages of decedents in each division of ages to whole number of deaths, in each of the last nine years, and in the aggregate for two periods; one of ten years and seven months, from June 1st, 1852, to December 31st, 1862, inclusive; the other of ten years, from 1863 to 1872 inclusive:

Table XLIV.

Periods of Life.	1880.	1879.	1878.	1877.	1876.	1875.	1874.	1873.	1872.	10 y'rs. 1863 to 1872.	10 y'rs, 7 m'hs. 1852 to 1862.
Under 1 year........	18.4	16.1	16.6	17.4	19.5	20.8	19.9	19.3	22.8	18 0	17.6
1 and under 2......	7.0	6.8	8.1	8.1	7.4	6.8	7.8	9.2	8.0	7.8	9.8
2 and under 5.	9.2	10.1	10.3	9.5	7.0	7.0	9.4	8.1	5.5	7.9	9.6
Total under 5........	34.6	33.0	35.0	35.0	33.9	34.6	37.1	36.6	36.3	33.7	37.0
5 and under 10... ..	6.2	6.3	6.2	6.2	4.2	4.0	5.7	5.3	2.7	4.6	5.0
10 and under 20..... ..	4.8	4.8	6.1	5.4	5.2	5.5	6.0	6.9	6.5	6.2	5.8
20 and under 30..... ..	8.6	8.8	8.8	8.9	9.1	9.6	8.7	9.1	9.9	9.7	9.5
30 and under 40..... ..	7.6	7.4	7.6	7.5	7.7	7.9	6.9	7.8	8.5	8.1	8.7
40 and under 50... ..	6.6	6.5	6.4	6.6	6.9	7.7	6.8	6.5	7.3	7.2	7.5
50 and under 60..... ..	6.7	7.1	7.6	7.2	7.5	7.4	7.0	6.4	6.7	7.3	6.7
60 and under 70.	8.5	10.0	7.9	8.8	9.3	8.6	7.8	7.6	8.2	8.3	6.9
70 and under 80	9.4	9.0	8.8	9.5	9.8	8.4	8.1	8.3	7.7	8.4	7.3
80 and under 90..... ..	5.7	5.5	4.8	4.0	5.2	5.0	4.7	4.5	5.4	5.4	4.6
Over 90 and not stated	1.3	1.6	0.8	0.9	1.2	1.3	1.2	1.0	0.8	1.1	1.0
Total.........	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

An inspection of the foregoing Table will show, that the percentage to whole mortality during the year 1880, was larger in the period of life under one year than during any one of the three previous years. The total percentage under five years was also larger than during 1879, but was at the same time less than the annual average of twenty-eight years. It has been noticed during the last four years, that diarrhœal diseases among children, and especially cholera infantum, have been less prevalent than in former years.

It may be of interest to see what changes have occurred in the percentages of mortality from cholera infantum, from year to year, since and including 1875.

PERCENTAGES OF MORTALITY FROM CHOLERA INFANTUM.

	1875.	1876.	1877.	1878.	1879.	1880.
Rhode Island,	7.74	6.41	6.08	3.97	3.81	5.43

It will be seen by the above comparisons, that cholera infantum has prevailed only to greatly lessened extent during the last three years, although there was an increase during 1880.

Doubtless this factor alone has a large share in the lessened percentage of mortality in young children, during 1878 and 1879.

To show some of the strong contrasts of death rates, in the different divisions of age, in different sections of the State, the following summary is presented. It will be understood that the percentages are the proportion of deaths in each division of age, to the total deaths in each town or city taken.

	Under 1 year.	Under 5 years.	5 to 20.	20 to 50.	50 and over.
1880.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Whole State	18.4	34.6	11.0	22.8	31.6
Providence City	18.3	35.2	11.0	25.5	28.3
Woonsocket	27.0	53.5	9.7	18.2	18.6
Lincoln	25.0	52.1	13.3	16.5	18.1
Foster	00.0	10.0	00.0	24.0	66.0
Jamestown	00.0	00.0	00.0	50.0	50.0
Little Compton	00.0	00.0	6.6	20.0	73.4

The great difference in the percentages of decedents under one year of age in different towns, is strikingly shown in the above summary.

The large proportion of more than one quarter of all the deaths in Woonsocket, occurring in children under one year of age, is not unprecedented in that town, it having occurred for three years in succession. It will be seen that Lincoln has also a death proportion of one quarter under one year, which is less than during some previous years, while Providence city has only a proportion of 18.3 per cent., and some towns with not a single death of persons under one year. The occurrence of more than half of all the deaths, in the period of life under five years of age, in Woonsocket and Lincoln, would seem to be evidence that there was not only a very large percentage of the population of that age, but that there was a great lack of vital force, or inherited or acquired physical defect in that class, either from prenatal influences in parentage, or improper management in infancy and early childhood, the result of ignorance and indifference on the part of parents and guardians. The city of Providence shows a proportion of 35.4 per cent. of decedents under five years of age, the town of Foster 10.0 per cent., the towns of Jamestown and Little Compton no deaths under five. It will be understood that the birth rate is small in those towns, and the proportion of children small.

COLORED DECEDENTS.

The statistics of the colored population of Rhode Island are always included in the general statistics of the State. But on account of several questions of considerable importance, the statistics of births, marriages and deaths have been separately considered. This has seemed to be of more consequence in Rhode Island, because the number of this class of the people is larger, proportionally, than in most northern States.

The number of deaths reported in 1880 among the colored population was 153. The number is 15 less than in 1879, and 3 less than in 1878. They occurred in the different towns as follows:

Providence City		96
Newport City		28
East Greenwich		8
Bristol		6
Warwick		5
Cranston		4
Warren, East Providence.	2 each	4
Johnston and Pawtucket,	1 each	2
Total		153

Sex.—Of the 153 colored decedents, 70 were males and 83 females.

Season.—These 153 deaths were in the different months, as follows:

Months.	Deaths.	Months.	Deaths.	Months.	Deaths.	Months	Deaths.
January	9	April	9	July	14	October	8
February	12	May	22	August	18	November	17
March	12	June	14	September	7	December	11
1st Quarter	33	2d Quarter	45	3d Quarter	39	4th Quarter	36

First six months, 78; second six months, 75. Total, 153.

Age.—The average age of the colored decedents in Rhode Island, in 1880, was as follows:

	Providence City.	Rest of State.	Whole State.
Colored males	26.5 years	27.4 years	26.9 years.
Colored females	34.0 years	42.8 years	37.3 years.

SUMMARY OF COLORED POPULATION: INCLUDING ALL NATIVITIES.

The number of births, marriages and deaths among the colored population of Rhode Island, in the several divisions of the State, in 1880, is given in the following Table, compared with the colored population in each division, as found by the United States Census of 1880.

TABLE XLV.

COUNTIES.	Colored Population, 1880.	Births, 1880.		Marriages, 1880.		Deaths, 1880.	
		Number.	To population one birth in	Number.	Of population, one person married in	Number.	Of population, one death in
Bristol County	209	4	52.2	2	52.2	8	26.1
Kent County	330	11	30.0	4	41.2	13	25.4
Newport County	1,129	20	56.4	8	70.0	28	40.3
Providence County, Towns	496	9	55.1	2	124.0	8	62.0
*Providence City	3,646	87	41.9	57	32.0	96	38.0
Washington County	782	9	87.0	3	130.0	0	00.0
Whole State	6,592	140	47.1	76	43.3	153	44.0

In 1878 the proportions of the above events in the whole State, among the colored population, were as follows: One birth in every 36.4; one person married in every 39.2; and one death in every 40.2.

In 1879 the proportions were: One birth in every 39.6; one person married in every 51.4; one death in every 37.3.

In 1880, as will be seen in the above Table, the proportions were: One birth in every 47.1; one person married in every 43.3; and one death in every 44.0 persons of color.

During the last three years, the proportion of colored births to colored population has gradually grown less; the proportion of colored persons married has also grown less; and the proportion of deaths to population, which was 2.5 per cent., or 25 in each thousand, in 1878,

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* Including 64 not of African descent.

advanced to 2.7 per cent., or 27 in each thousand in 1879; and receded to 2.3 per cent., or 23 in each thousand in 1880, based upon the Census of that year.

The difference in the vital statistics between the white and the colored population, in 1880, may be presented as follows:

White	One child born in every 43.8;	one person married in every 50.2;	one death in every 57.7.
Colored	One child born in every 47.1;	one person married in every 43.3;	one death in every 44.0.
Whole No. white and colored.	One child born in every 43.9;	one person married in every 49.9;	one death in every 57.3.

Allowance should be made for the difference in the number of colored persons in the State, upon which the foregoing calculations are based; those of 1878 and 1879 are upon the Census of 1875, and those of 1880 upon the Census of 1880, which makes the colored population larger by 321 persons.

In 1880, the proportions of births, and of persons married in this class, to its population, were smaller than in the white population, while the proportion of deaths to its population was considerably larger than among the whites.

The following summary shows the number of births, marriages and deaths among the colored population of Rhode Island, in each of the last twenty years, from 1861 to 1880 inclusive:

COLORED POPULATION.

1861	97 births	30 marriages	109 deaths.
1862	96 births	23 marriages	90 deaths.
1863	73 births	68 marriages	104 deaths.
1864	69 births	35 marriages	121 deaths.
1865	87 births	51 marriages	129 deaths.
1866	124 births	65 marriages	123 deaths.
1867	144 births	61 marriages	105 deaths.
1868	147 births	84 marriages	111 deaths.
1869	136 births	70 marriages	133 deaths.
1870	158 births	70 marriages	128 deaths.
1871	146 births	64 marriages	116 deaths.
1872	171 births	76 marriages	184 deaths.
1873	163 births	69 marriages	160 deaths.
1874	170 births	80 marriages	151 deaths.
1875	156 births	76 marriages	169 deaths.
1876	170 births	59 marriages	156 deaths.
1877	168 births	64 marriages	160 deaths.
1878	172 births	80 marriages	156 deaths.
1879	159 births	61 marriages	168 deaths.
1880	140 births	76 marriages	153 deaths.
Total	2,746 births	2,262 marriages	2,726 deaths.

The number of colored births in 1880 were less than in any year since 1866, and seem to be gradually growing less in number, while the colored population has increased slightly by immigration, and consequently the percentage has grown considerably smaller. The number and percentage of deaths were smaller than usual. During a period of twenty years the number of births have exceeded the number of deaths by twenty only.

CAUSES OF DEATH, 1880.

The statistics of the causes of death in Rhode Island, in 1880, will be found in Tables VIII., IX., X. and XII. The whole number of deaths, as previously stated, was 4,829. The number of which the cause of death was reported was 4,596, and the number of which the cause was not stated was 233. The number from unknown causes was 21 less than in 1879.

The following Table shows the number of deaths in 1880, in each larger division of the State, and the number and proportion in each division, of which the cause was unknown:

TABLE XLVI.

1880.	Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.	Whole State.
Number of deaths...........	219	306	107	243	1,588	2,080	286	4,829
Cause not stated.	10	13	2	24	151	17	16	233
One in....	21.9	23.5	53.5	10.1	10.5	122.3	17.8	20.7

A decided improvement in the completeness of the returns of deaths in the different divisions of the State during 1880, is shown by the lessened number of deaths reported with the cause of death unknown. This improvement is seen in nearly all the divisions and in the whole State, but it is far from being satisfactory. In the Report for 1879 it was remarked "That the returns of the *causes* of deaths are manifestly more *unnecessarily* incomplete than any other of the vital statistics of the State. That the *cause* of death in one out of every 17 or 18 of the decedents in the State should be returned as unknown, is positive evidence that there is a defect in the Registration law, as well as proof that there is neglect of duty on the part of those who should observe the law as it stands. The remedy is in the enactment of a law for the State such as is provided by municipal ordinance in the city of Providence, that is, the requirement of burial permits, and the pre-requirement of return of death, and *cause* of death when known." It will be futile to expect any very complete returns of all the circumstances connected with each death, until such a law is enacted and enforced.

TABLE XLVII.

Showing the proportion of deaths reported, with "cause unknown," in each Division of the State, and in the whole State, in each of the last eighteen years, from 1863 to 1880 inclusive.

YEARS.	Bristol County.	Kent County.	Newport County.	Providence County Towns.	Providence City.	Washington County.	Whole State.
1863, One in	16.5	11.2	25.5	6.9	46.7	24.7	14.7
1864, One in	57.0	12.6	11.6	8.5	45.7	47.6	16.1
1865, One in	64.3	27.4	13 4	8.2	55.0	32.9	16.4
1866, One in	163.0	11.4	22.4	9.5	45 0	23.3	17.3
1867, One in		13.6	34.5	7.4	64.0	14.3	14.8
1868, One in	33.2	5 0	20,3	5.2	46.2	10.1	10.1
1869, One in	41.2	5.8	52.8	5.3	83.6	16.1	11.3
1870, One in		19.3	23.6	11.8	90.2	26.9	23.6
1871, One in	151.0	81.2	7.9	8 4	83.6	9.8	13.0
1872, One in	13.3	5.8	10.0	6.8	72.8	9.8	11.3
1873, One in		16.0	25.4	9.8	102.5	27.5	20 3
1874, One in	54.0	15.2	14.0	17.2	73.7	21 2	27.8
1875, One in	55.0	7.4	15.6	13.7	91.2	11.9	20.9
1876, One in	11.5	7.9	18 5	9.9	124.3	22.8	19.3
1877, One in		17.7	9.7	11.9	323.0	16.0	23.2
1878, One in	32.1	7.4	9.0	13.7	124.2	21.7	21.1
1879, One in	16 6	9.2	12.4	9.5	225.1	8.6	17.6
1880, One in	21.9	23.5	13.5	10.5	122.3	17.8	20.7

It seems hardly possible that such great variations in the number of decedents, the cause of whose death is unknown to physician or acquaintance, could occur from year to year, as shown in Table XLVII.

In Bristol county, for instance, in four of the eighteen years the cause of death was given in every return, while in one of the eighteen years the cause of death was returned unknown in one out of every 11.5 decedents.

In Kent county, the smallest proportion of deaths reported from cause unknown, during eighteen years, was in 1871; that is, one in every 81.2, or about 1.2 per cent. The largest proportion was in 1868; that is, one in every 5, or 20 per cent. The proportion is smaller for 1880 than for any one of the previous eight years.

Newport county, including the city of Newport, shows a general average of one death from cause unknown to every 13.5 of the decedents, or about 7.4 per cent. In the city of Newport, in 1878, the proportion was about 14 per cent.; while in the towns of Newport county it was only about 2.6 per cent. In 1879 there was less disparity of proportion between the city and county towns, but the proportion in the city was in that year more than twice as large, and in 1880 more than five times as large. Comments are needless.

The towns in Providence county have always shown a large number of deaths returned with cause unknown. The proportions have invariably been large, and therefore have varied less than any other division. The smallest proportion was in 1874; that is, about six per cent.; and the largest in 1868, which was about 20 per cent.

Providence city is a very good example of what may be accomplished by a "burial permit" law, properly enforced. During a period of eighteen years, the largest proportion of deaths returned with cause unknown was one in every 45.0, in 1866; and the smallest, one in every 323, in 1877.

In Washington county, the proportion of deaths reported from cause not known was the largest in 1879 of any one of the previous sixteen years, that is, one in every 8.6 decedents, or nearly twelve per cent. In 1880 it was one in every 17.8, or 5.6 per cent.

The proportion in the whole State, one in every 20.7 decedents, or 4.8 per cent., is somewhat less than that of 1879.

PRINCIPAL CAUSES OF DEATH.

The following Table gives the number of deaths in Rhode Island, from each of thirteen principal causes, showing the order in regard to number, in each of the last three years, and also in the aggregate of deaths for twenty-five years and seven months, from June 1st, 1852, to December 31st, 1877:

TABLE XLVIII.

Showing the order in regard to number of decedents from thirteen principal causes of death.

1880.		1879.		1878.		June 1st, 1852, to Dec. 31st, 1877—25 yrs. 7 mos.	
Whole Number	4,829	Whole Number	4,472	Whole Number	4,441	Whole Number	77,399
Consumption	642	Consumption	637	Consumption	676	Consumption	12,627
Scarlatina	468	Pneumonia and Conges. of Lungs	311	Diphtheria	435	Pneumonia and Conges. of Lungs	4,436
Pneumonia and Conges. of Lungs	364	Scarlatina	311	Pneumonia and Conges. of Lungs	317	Old Age	4,163
Old Age	273	Diphtheria	259	Old Age	222	Cholera Infantum	4,002
Cholera Infantum	247	Apoplexy and Paralysis	220	Cholera Infantum	168	Scarlatina	3,350
Heart, Diseases of	231	Old Age	220	Heart, Diseases of	166	Fevers, Typhoid, &c	2,952
Apoplexy and Paralysis	215	Heart, Diseases of	202	Fevers, Typhoid, &c	150	Heart, Diseases of	2,829
Fevers, Typhoid, &c	158	Cholera Infantum	161	Accidents (all kinds)	122	Apoplexy and Paralysis	2,579
Diphtheria	152	Cancer (all kinds)	125	Cancer (all kinds).	119	Accidents (all kinds)	2,349
Accidents	137	Fevers, Typhoid, &c	123	Convulsions and Fits	112	Dysentery	1,975
Convulsions, &c	133	Convulsions, &c	104	Apoplexy and Paralysis.	102	Convulsions and Fits	1,642
Cancer	125	Accidents	102	Croup	93	Croup	1,580
Debility	118	Croup	96	Scarlatina	86	Diphtheria	1,783

With the exception of Consumption, no disease or cause of death maintains its place in the order of number from year to year.

Consumption, as in all previous years, stands at the head of the list in formidable numbers and proportion, as the most active agent of death.

It is of some interest to note the changes that occur from one year to another, in regard to the number of deaths, and place on the list, of the twelve principal causes of death following Consumption, as shown in Table XLVIII.

Scarlatina, which will be seen at the foot of the list in 1878, rose to third place in 1879, and to second place in 1880, with a proportion of more than one tenth of all the specified causes of deaths in that year.

Diphtheria, which was second in the list in 1878, was fourth in 1879, and ninth in 1880.

Croup, which has had a place on the list in every previous year, has during 1880 been displaced by Debility, which is a rather indefinite term as a cause of death, and in many instances is doubtless returned as a name to cover real organic diseases of a chronic character not well understood.

TABLE XLIX.

Showing the Deaths in Rhode Island, in 1880, from Sixteen Principal Causes.

		Accidents.	Apoplexy and Paralysis.	Brain, Diseases of.	Cancer.	Cholera Infantum.	Consumption.	Croup.	Diarrhœa.	Diphtheria.	Dysentery.	Fevers, Typhoid, &c.	Heart, Diseases of.	Hooping Cough.	Old Age.	Pneumonia and Congestion of Lungs.	Scarlatina.
Whole Number		137	215	161	125	247	642	66	70	152	28	158	231	20	273	364	468
SEX.	Males	101	109	87	45	123	287	32	34	73	15	74	125	10	121	180	215
	Females	36	106	74	80	124	355	34	36	79	13	84	106	10	152	184	253
PAR'AGE.	American	52	157	87	73	109	287	27	31	75	19	94	146	7	186	177	216
	Foreign	85	58	74	52	138	355	39	39	77	9	64	85	13	87	187	252
SEASON.	January	12	21	27	11	.....	49	9	.....	17	....	5	24	1	25	35	75
	February	12	8	9	5	2	55	5	1	11	.....	8	28	1	23	28	55
	March	8	20	11	5	.....	64	5	3	11	....	12	19	1	34	54	54
	April	8	15	13	7	4	63	5	3	11	3	8	20	....	20	52	44
	May	16	19	19	13	5	44	.....	1	8	1	10	18	2	23	42	51
	June	13	15	9	13	16	39	1	3	8	5	11	18	3	24	31	31
	July	13	17	16	7	107	54	2	23	11	6	6	13	.....	19	13	32
	August	12	14	12	18	57	54	.....	15	9	7	12	16	2	24	11	28
	September	11	13	10	8	34	58	7	15	19	2	24	15	2	13	12	19
	October	15	30	11	11	17	59	5	2	18	4	34	14	.....	30	31	24
	November	9	24	8	12	4	54	19	2	12	.....	17	26	3	18	25	29
	December	8	19	16	15	1	49	8	2	17	.....	11	20	5	20	30	26

TABLE XLIX.—Continued.

Showing the Deaths in Rhode Island, in 1880, from Sixteen Principal Causes.

		Accidents.	Apoplexy and Paralysis.	Brain, Diseases of.	Cancer.	Cholera Infantum.	Consumption.	Croup.	Diarrhœa.	Diphtheria.	Dysentery.	Fevers, Typhoid, &c.	Heart, Diseases of.	Hooping Cough.	Old Age.	Pneumonia and Congestion of Lungs.	Scarlatina.
AGES.	Under 5 years......	28	1	96	.....	247	30	53	47	86	13	19	7	19	....	95	291
	5 and under 10....	19	.....	15	.....	.....	3	12	1	42	1	6	2	1	.....	18	139
	10 " " 15....	7	.....	2	.....	.....	14	1	1	14	.....	12	3	.....	....	3	21
	15 " " 20....	6	.....	2	.....	.....	44	....	.....	6	1	24	3	.....	.....	16	6
	20 " " 30....	16	2	5	4	....	199	.....	....	3	1	43	10	.....	.....	14	9
	30 " " 40....	16	8	5	18	.....	135	.....	1	1	.....	23	18	.....	.....	33	...
	40 " " 50....	19	18	8	18	.....	82	.....	.....	.....	2	12	23	.....	.....	37	1
	50 " " 60....	9	21	5	25	.....	50	.....	2	.....	3	10	38	.....	.....	46	1
	60 " " 70....	5	59	8	29	.....	55	.....	10	.....	3	5	49	.....	1	47	...
	70 " " 80....	6	70	9	25	.....	20	.....	4	.....	3	3	49	.....	88	43	...
	80 and over........	3	34	6	6	.....	9	.....	4	.....	1	.....	28	.....	184	12	...
	Not stated.........	3	2	.....	.....	.....	1	.....	.....	.....	.....	1	1	.....	.....	.....	...
LOCALITY.	Bristol County.....	4	18	3	5	13	19	3	1	3	3	8	9	.....	12	26	22
	Kent County......	17	13	6	10	11	45	3	1	6	5	12	21	.....	20	16	30
	Newport Co., Towns	4	11	3	2	3	12	1	.....	.....	.....	1	6	.....	15	7	4
	Newport City......	5	11	8	10	7	22	3	10	2	.....	4	23	2	19	11	7
	Prov. Co., Towns...	38	71	55	26	93	189	20	24	63	8	66	59	6	90	92	143
	Providence City....	65	78	80	68	100	322	30	30	61	12	52	104	11	73	192	243
	Washington Co.....	4	13	6	4	20	33	6	4	17	.....	15	9	1	44	20	19

COMMENTS.

In the following remarks upon the various principal causes of death in Rhode Island, during the year 1880, an alphabetical order will be followed, as presented in Table XLIX.

DEATHS FROM ACCIDENTS.

The number of deaths from accidental causes of all kinds, reported in Rhode Island in 1880, was 137. This number is 35 more than in 1879, and 15 more than in 1878.

Of these 137 deaths, 21 were from burns and scalds; 33 by drowning; 14 from falls; 5 from poisoning; 18 from railroad accidents, and 46 from various accidents too numerous to specify.

Of the whole number of deaths by accidents, 101 were males, and 36 were females; 52 were of American, and 85 were of foreign parentage.

It will be noticed how much larger the proportion of males is than that of females; that is, 74 per cent. of male decedents to 26 per cent. of female decedents. Of parentage, 62 per cent. was of foreign, and 38 per cent. of American.

The number of deaths in each quarter of the year was as follows:

First Quarter	32	Second Quarter	37
Third Quarter	36	Fourth Quarter	32
Total	137		

In regard to periods of life, the decedents from accidental causes were divided as follows: Under 5 years, 28; 5 and under 10, 19; between 10 and 20, 13; between 20 and 40, 32; between 40 and 60, 28; over 60, 14; and three, age not stated.

In regard to sectional divisions of the State, 4 of the deaths from accidental causes were in Bristol county; 17 in Kent county; 9 in Newport county; 4 in Washington county, and 103 in Providence county. In Providence county, with less than 72 per cent. of the whole population of the State, there was 75 per cent. of the whole number of deaths from accidents, and in Providence city, with about 38 per cent. of the population of the State, there was about 47 per cent. of the deaths from the same causes.

The whole number of deaths from accidental causes, in 1880, *in proportion to the whole number of deaths* from specified causes, in the State, was 3 per cent.; the extremes were 5.8 per cent. in Kent county, and 1.5 per cent. in Washington county.

In *proportion to population* the accidental deaths were as follows:

Bristol County	One in every 2,818 of the population.
Kent County	One in every 1,211 of the population.
Newport County	One in every 2,686 of the population.
Providence County, Towns	One in every 2,447 of the population.
Providence City	One in every 1,613 of the population.
Washington County	One in every 5,624 of the population.
Whole State	One in every 2,018 of the population.

APOPLEXY AND PARALYSIS.

The number of deaths reported in Rhode Island, in 1880, caused by Apoplexy and Paralysis, was 215.

This number is 5 less than in the preceding year, and 27 more than in 1878.

The following Table will present some of the incidental relations of these causes of death, during the last sixteen years:

TABLE L.

Showing the whole number and percentage of the Deaths in the State, from Apoplexy and Paralysis combined; and also the Sex and Parentage of the Decedents from these causes, and the number of the same in each of the Counties, from 1865 to 1880 inclusive.

YEARS.	Whole Number of Deaths.	APOPLEXY AND PARALYSIS.											
				SEX.		PARENTAGE.		DIVISIONS OF THE STATE.					
		Number from Apoplexy and Paralysis.	Per cent.	Males.	Females.	American.	Foreign.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.
1865	3,405	100	2 93	52	48	81	19	9	8	14	23	38	8
1866......	2,970	92	3.09	46	46	80	12	8	5	17	24	29	9
1867......	2,889	124	4.29	59	65	101	23	9	9	13	35	49	9
1868......	2,912	111	3.81	56	55	86	25	9	6	19	27	46	4
1869......	3,382	117	3.46	55	62	92	25	12	13	18	20	48	6
1870	3,238	130	4.32	68	62	105	25	14	10	10	39	52	5
1871. . ..	3,344	156	4.66	73	83	113	43	10	17	15	40	61	13
1872......	4,247	125	2.97	62	63	96	29	17	9	10	27	52	10
1873	4,403	134	3.04	59	75	109	25	9	8	17	26	57	17
1874......	4,229	156	3 69	84	72	120	36	14	10	16	42	59	15
1875......	4,317	166	3 61	79	87	133	33	7	13	17	46	75	8
1876......	4,116	165	4 01	79	86	130	35	13	11	13	45	68	1
1877	4,450	181	4.07	87	94	123	58	10	10	16	52	74	19
1878......	4,441	188	4.23	104	84	145	43	12	16	21	58	66	15
1879......	4,472	220	4.92	114	106	146	74	12	9	29	71	89	10
1880......	4,829	215	4.67	109	106	157	58	18	13	22	71	78	13
Total.. ..	61,644	2,380	3.80	1,168	1,194	1,817	563	183	167	267	646	941	176

There was a slight falling off in number and percentage of deaths from Apoplexy in 1880, as compared with the previous year. It is none the less true, however, that the percentage of deaths from these causes, in proportion to whole number of deaths, has gradually increased, with slight fluctuations only, throughout the whole period of registration presented above. It will be seen that the proportion in 1865 was less than 3 per cent., and that in 1879 it had reached nearly 5 per cent. It can scarcely be expected that the increase will continue in the years to come, with an equal pace.

The increase in number and proportion, as will be seen in Table L., is largely in decedents of foreign parentage, in which class the increase during the last four years is something phenomenal.

TABLE LI.

Showing the ages of Decedents from Apoplexy and Paralysis in each of the last sixteen years.

APOPLEXY AND PARALYSIS.	PERIODS OF LIFE.								
	Under 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 and over.	Not stated.
1865	.....	3	5	6	19	20	28	19	.....
1866	1	1	7	16	9	24	27	7	...
1867	2	.....	6	6	15	38	40	17	.....
1868	2	3	3	11	16	27	31	16	2
1869	1	1	5	12	20	28	34	15	1
1870	4	1	10	9	12	33	41	20	....
1871	3	4	7	14	21	46	45	15	1
1872	1	4	5	17	20	26	41	11	.....
1873	2	3	4	14	22	35	37	16	1
1874	1	2	9	9	30	39	40	25	1
1875	6	2	8	19	23	40	45	22	1
1876	4	4	4	13	25	43	49	23	.....
1877	1	2	9	12	24	50	61	22	....
1878	4	2	7	14	41	40	53	26	1
1879	4	6	11	18	27	57	59	38	.....
1880	1	2	8	18	21	59	70	31	2
Total	37	40	108	208	345	605	690	326	10

Apoplexy is not a disease to be expected in the earlier periods of life. Paralysis resulting from other causes sometimes occurs, and is occasionally fatal. Hence as the two diseases are taken together in the above Table, there is one case recorded under 20 years of age. The largest number in every year, with scarcely an exception, is between the ages of 70 and 80. Above the age of 50 years, the number of decedents from apoplexy and paralysis increases rapidly in the ratio of mortality. More than 80 per cent. of all the deaths from these causes, are of persons above 50 years of age.

PROPORTION TO POPULATION.

Bristol County	One in every 633 persons.
Kent County	One in every 1,583 persons.
Newport County	One in every 1,099 persons.
Providence County, Towns	One in every 1,310 persons.
Providence City	One in every 1,344 persons.
Washington County	One in every 1,730 persons.

It appears that in 1880, there were nearly three times as many deaths from apoplexy and paralysis in Bristol county, in proportion to the population, as there were in Washington county, and more than twice as many as in any other division, except Newport county.

BRAIN, DISEASES OF.

In Table XLIX., under the head of "Diseases of the Brain," are included all those reported as "Cerebral Meningitis," "Cerebritis," "Congestion," "Inflammation," and "Diseases of the Brain.".

The number of decedents from these several causes, grouped under the head of "Diseases of the Brain," in 1878, was 139; in 1879 was 157; and in 1880 was 161. The proportion to whole mortality in the State, was 3.72 per cent. in 1879, and 3.49 per cent. in 1880. Of the 161 decedents, 87 were males, and 74 were females. In regard to parentage, 87 were of American, and 74 of foreign parentage.

The deaths in the different seasons of the year were as follows:

First Quarter	47	Second Quarter	41
Third Quarter	38	Fourth Quarter	35
Total	161		

In relation to the periods of life, 96 of the deaths were of children under 5 years of age, or nearly 60.0 per cent. of the whole number.

CANCER.

Cancer was reported as the cause of 125 deaths in 1880. The term "Cancer" includes all the different varieties.

The number of decedents from this cause, in 1880, was the same as in 1879.

The percentage of whole number of deaths in 1880, was 2.72, as against 2.96 in 1879. The difference in the percentage is occasioned by the larger number of deaths from other causes in 1880.

The varieties of cancer as reported, may be found in Tables VIII. and IX., on pages 16 and 21. They were classed as follows: Cancer in various general localities, or cancer (various), 78; cancer of the breast, 8; of the stomach, 18; of the uterus, 21.

In 1880, the deaths from cancer, in the several seasons of the year, were as follows:

First Quarter	21	Second Quarter	33
Third Quarter	33	Fourth Quarter	38
Total	125		

CHILD-BIRTH.

Cases of death are reported as having been caused by child-birth, without stating whether from hemorrhage, convulsions, nervous shock, local injury or what. As child-birth was the primary cause, the immediate cause is not so important. Under the head of "Child-birth," therefore, are included puerperal fever, puerperal convulsions, and whatever causes that can only occur as the result of child-birth.

The number reported in 1880, was 51; 33 of which were from the immediate effects of child-birth, without specifying particular cause, 3 from puerpural convulsions, and 15 from puerpural fever.

Of the 33 decedents from the immediate effects of child-birth, 15 were of American, and 18 were of foreign parentage; of the 3 from puerpural convulsions, 2 were of American, and 1 of foreign parentage; of the 15 from puerpural fever, 6 were of American, and 9 of foreign parentage.

Of the whole number, 23 were of American, and 28 of foreign parentage.

In the different seasons of the year they occurred as follows:

First Quarter	20	Second Quarter	8
Third Quarter	5	Fourth Quarter	18

Of the decedents, 20 were under 20 years of age, 27 between 20 and 30, 18 between 30 and 40, and the remaining 4 over 40 years of age.

CHOLERA INFANTUM.

The number of deaths reported as caused by cholera infantum, in 1880, was 247.

This number is very much larger than that of the two previous years, as may be seen by reference to Table LII.

This disease had been gradually growing less, diminishing from 391 in 1872, to 161 in 1879. It is quite probable that the number in 1879 will be the minimum of a long series of years following 1870.

Of the 247 decedents, 123 were males and 124 females; 109 were of American, and 138 of foreign parentage; 180 were under the age of one year, and 67 were between 1 and 2 years of age.

In regard to season, two deaths were reported in February, four in April, five in May, 16 in June, 198, or about 80.0 per cent., in the months of July, August and September, and 22 during the rest of the year.

The following Table shows the whole number of reported deaths from cholera infantum; the sex and parentage of the decedents, in each of the larger divisions of the State, in each of the last sixteen years:

TABLE LII.

YEARS.	CHOLERA INFANTUM.										
	Number of Deaths.	SEX.		PARENTAGE.		DIVISIONS OF THE STATE.					
		Males.	Females.	American.	Foreign.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.
1865	145	63	82	61	84	17	7	14	48	50	9
1866	110	67	43	50	60	1	7	8	39	47	8
1867	117	64	53	62	55	4	3	7	45	49	9
1868	154	85	69	66	88	13	4	12	44	70	11
1869	151	81	70	79	72	6	15	6	48	65	11
1870	213	106	107	95	118	15	15	13	69	93	8
1871	172	85	87	82	90	14	12	12	59	62	13
1872	391	195	196	167	224	16	16	21	157	151	30
1873	285	148	137	165	120	17	14	16	120	99	19
1874	265	140	125	115	150	4	12	5	84	134	26
1875	318	156	162	155	163	20	16	20	108	136	18
1876	250	131	119	105	145	5	12	29	68	124	12
1877	259	139	120	96	163	12	13	9	96	122	7
1878	168	96	72	73	95	7	14	7	64	71	5
1879	161	88	73	71	90	8	16	21	51	59	6
1880	247	123	124	109	138	13	11	10	93	100	20
Total, 16 years	3,406	1,767	1,639	1,551	1,855	172	187	210	1,193	1,432	212

It will be seen that during the last sixteen years, 3,406 children have died from cholera infantum, of which 1,767 were males, and 1,639 were females.

Of American parentage there were 1,551, and of foreign parentage 1,855, or about 120 foreign to each 100 of American parentage.

CONSUMPTION.

The number of decedents during 1880, in Rhode Island, reported as having died from consumption, was 642.

This number is less than during any year since 1874, with the exception of 1879.

The proportion to the whole number of deaths, 14.02 per cent., is not only less than that of 1879, because of the larger whole number of deaths in 1880, but also less than in any year during the whole period of registration.

The average of twenty years, from 1860 to 1879 inclusive, was 16.84 per cent.

Of these 642 decedents, 287 were males, and 355 were females.

In regard to parentage, 287 were of American, and 355 were of foreign parentage.

The proportions of the sexes are 44.7 males, and 55.3 females in each one hundred, or 123.7 females to each 100 males.

The proportions in regard to parentage are 44.7 males, and 55.3 females in each one hundred, singularly coinciding in proportion with the sexes, in the order named.

There were 123.7 of foreign parentage to each 100 of American.

In regard to season, the largest number of deaths occurred in the first quarterly division of the year, and the smallest number in the second, as will be seen by the following summary:

First Quarter	168	Second Quarter	146
Third Quarter	166	Fourth Quarter	162
Total	642		

The largest mortality in any one month was in March, the next largest in April, and the smallest in June.

The month of May has shown the largest number of deaths from consumption, with a very few exceptions, during the whole twenty-eight years of registration. In 1880, this month reported only 44, the next to the smallest monthly number in the year.

In relation to age, consumption spares no period of life, but the largest number of decedents are found between the ages of twenty and forty.

In 1880, 334, or more than 50 per cent. of the whole number of deaths from consumption, were of persons between twenty and forty years of age. In order to show more concisely the relation of age to mortality, the following synopsis is presented:

Ages.	No. of Deaths.
Under 10 years of age	33
Between 10 and 20 years	58
Between 20 and 30 years	199
Between 30 and 40 years	135
Between 40 and 50 years	82
Between 50 and 70 years	105
Over 70 years	30
Total	642

The distribution of mortality from consumption, in the different sections of the State, is very unequal, not only in the percentage to the whole number of deaths in each section, but also in proportion to the population.

The following Table shows the total deaths from all reported *known causes*, with the number and percentage of deaths from consumption, in each of the larger divisions of the State, and in the whole State, in each of the last fifteen years, and in the aggregate for a period of twenty years, from 1860 to 1879 inclusive:

TABLE LIII.—CONSUMPTION.—*Number and Percentage.*

COUNTIES.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	Total 20 years. 1860-1879.
BRISTOL COUNTY.																
Total Deaths	162	144	129	165	146	150	184	173	159	162	148	201	187	141	209	3,144
Consumption	31	18	21	26	26	16	23	16	18	21	19	27	23	16	19	423
Percentage	19.13	12.50	16.28	15.76	17.81	10.67	12.50	9.24	11.32	12.97	12.83	13.43	12.30	11.35	9.09	13.45
KENT COUNTY.																
Total Deaths	198	214	168	265	238	281	248	241	252	263	209	251	249	277	293	4,761
Consumption	41	56	38	50	46	63	33	42	32	43	28	42	41	38	45	870
Percentage	20.70	26.17	22.62	18.86	19.33	22.42	13.30	17.43	12.69	16.35	13.39	16.73	16.47	13.72	15.35	18.28
NEWPORT COUNTY.																
Total Deaths	342	302	289	259	271	214	262	366	221	277	280	243	265	330	324	6,017
Consumption	52	47	43	40	37	23	29	44	26	41	45	33	31	45	34	857
Percentage	15.18	15.56	14.88	15.44	13.66	10.75	11.06	12.02	11.77	14.80	16.07	13.58	11.69	13.64	10.49	14.24
PROVIDENCE COUNTY, TOWNS.																
Total Deaths	883	902	779	912	964	989	1,331	1,389	1,217	1,230	1,110	1,391	1,308	1,233	1,437	20,385
Consumption	171	210	158	180	172	195	221	197	139	201	211	222	229	197	189	3,661
Percentage	19.36	23.28	20.29	19.74	17.84	19.72	16.73	14.18	11.42	16.34	19.01	15.96	17.51	15.98	15.35	17.95

TABLE LIII.—CONSUMPTION.—*Number and Percentage.—Continued.*

COUNTIES.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	Total 20 years. 1860–1879.
PROVIDENCE CITY.																
Total Deaths	1,013	945	1,086	1,240	1,249	1,239	1,581	1,725	1,965	1,894	1,850	1,932	1,973	2,017	2,063	28,194
Consumption	200	189	214	210	238	195	242	230	270	297	284	294	305	293	322	4,649
Percentage	19.74	20.00	19.71	16.95	19.06	15.74	15.31	13.33	13.74	15.68	15.35	15.22	15.46	14.53	15.60	16.49
WASHINGTON COUNTY.																
Total Deaths	201	187	173	241	233	222	265	292	263	284	306	240	249	220	270	4,513
Consumption	28	39	38	43	56	35	49	51	44	47	68	43	47	48	33	861
Percentage	13.93	20.86	21.96	17.84	24.04	15.76	18.49	17.47	16.73	16.55	22.22	17.91	18.88	21.82	12.22	19.08
WHOLE STATE.																
Total Deaths	2,799	2,694	2,624	3,082	3,101	3,095	3,871	4,186	4,077	4,110	3,903	4,258	4,231	4,218	4,596	67,214
Consumption	523	559	512	549	575	527	597	580	529	650	655	661	676	637	642	11,321
Percentage	18.68	20.74	19.51	17.81	18.52	17.03	15.41	13.86	12.96	15.79	16.78	15.52	15.98	15.10	14.02	16.84

The statistics of consumption presented in Table LIII., in regard to the number and percentage of decedents, in connection with locality, will enable the reader to make ready and conclusive comparisons.

It was remarked in a previous report that by arranging in parallel columns the items of single years, and combining together a long series of years, the results of single years can be readily compared, and the averages of a long period conclusively ascertained.

The variations of one year with another in the same locality, and of different localities in the same year, and the averages for a considerable number of years, are shown in such manner as to allow very definite conclusions.

In Bristol county, the annual percentages of mortality from consumption, to total deaths in the same county, have varied from 9.09 per cent. in 1880, to 19.13 per cent. in 1876.

The percentage of 1880, 9.09, is less than in any previous year. The average of twenty years is 13.45 per cent., and is the smallest of any county.

Kent county shows a variation of from 12.69 per cent. in 1874, to 26.17 per cent. in 1867. In 1879 the percentage was 13.72, scarcely above half that of 1867. The mean average percentage of the long period is 18.28, the largest, with one exception, of any county in the State.

Following close upon the low average percentage of the twenty year period in Bristol county, we find Newport county with a mean of 14.24 per cent., or about four-fifths of one per cent. larger.

The variations in the annual percentages of Newport county, as seen in the foregoing Table, are from 10.75 per cent. in 1871, to 16.07 per cent. in 1876. The percentage of 1880 is 10.49, the smallest on record.

Providence county towns show variations from 11.42 per cent. in 1874, to 23.28 per cent. in 1867, as may be seen in the Table. In 1862, there was in the towns of Providence county the high rate of 24.78 per cent., the largest on record for that county. In the same year the percentage of the whole State was 21.22, also the largest on record.

The percentage of consumption to total given causes of mortality in Providence county towns, in 1880, was 15.35; for twenty years, 1860 to 1879 inclusive, the average was 17.95 per cent.; or about two and two-thirds per cent. higher than the rate of 1880.

In Providence city, the proportion of deaths from consumption to total specified deaths, was 15.60 per cent.

Washington county has almost invariably shown a large percentage of mortality from consumption. The average percentage for the term of twenty years, is larger than any other section of the State. The smallest percentage during the last sixteen years was recorded in 1880, that is, 12.22; the largest in 1870, which was 24.04 per cent.

The average mortality of twenty years is 19.08 per cent.; and of 1879, 21.82 per cent., or more than 9.5 per cent. larger than in 1880.

The smaller proportional number of deaths from other diseases, makes the percentage of deaths from consumption larger. For instance, in 1879, the proportion of deaths from all diseases to population, in Washington county, was 11.1 in each one thousand; in Providence county, 17.2 in each thousand.

The variation of the extremes of proportion in the whole State, during the last fifteen years, is from 20.74 per cent. in 1867, to 12.96 per cent. in 1874.

The percentage of 1880 is, as before stated, 14.02, and the annual average of twenty years 16.84 per cent.

PROPORTION OF DEATHS TO POPULATION.

For the purpose of ascertaining and presenting the percentage of deaths from consumption, *in proportion* to the *population*, in the different divisions of the State, the following summary was prepared. It will show the yearly average number of deaths from this cause, and the proportion to population in each division, for a period of nineteen years; namely, from 1860 to 1879. If the population of all sections increased with equal ratio, such comparison would show the relative liability of the inhabitants of each section to the disease, with quite full accuracy. But as it is, an average of the semi-decennial enumerations will afford such an approximation to exactness, as to make the comparisons sufficiently correct.

1860 to 1879.

NINETEEN YEARS.

	Yearly average. No. of Deaths.	Yearly average to population one in every	
Bristol County	21.4	442	or 2.26 in each 1,000
Kent County	43.8	403	or 2.48 in each 1,000
Newport County	42.7	492	or 2.03 in each 1,000
Providence County, Towns	182.3	403	or 2.48 in each 1,000
Providence City	229.0	349	or 2.87 in each 1,000
Washington County	42.0	452	or 2.21 in each 1,000

For the purpose of comparison with the long period of nineteen years, as well as each with the other, the following summary for the two years 1879 and 1880 is presented:

CONSUMPTION, PROPORTION OF DEATHS TO POPULATION.

1879.

	Total Deaths.	To population one in every	
Bristol County	16	712	or 1.40 in each 1,000
Kent County	38	542	or 1.84 in each 1,000
Newport County	45	538	or 1 86 in each 1,000
Providence County, Towns	197	473	or 2.11 in each 1,000
Providence City	293	358	or 2.80 in each 1,000
Washington County	48	470	or 2.13 in each 1,000

1880.

	Total Deaths.	To population one in every	
Bristol County	19	599	or 1.66 in each 1,000
Kent County	45	458	or 2,18 in each 1,000
Newport County	34	711	or 1.40 in each 1,000
Providence County, Towns	189	496	or 2 03 in each 1,000
Providence City	322	326	or 3.07 in each 1,000
Washington County	33	681	or 1.50 in each 1,000

The proportions of 1879 and 1880 are based on the Census of 1880. It would appear by a comparison of the last two years, with the long period of nineteen years, that the proportion of deaths from consumption to population, was diminishing in all parts of the State outside of Providence city. The results of one or two years, however, are very inconclusive in regard to proportion, as very considerable changes in numbers not infrequently occur, from one year to another.

CROUP AND DIPHTHERIA.

These two diseases, similar in many respects, have been considered together in these reports since 1858. The contrast is made for the purpose of showing their various relations, the same as with other diseases, and not from any suspicion of identity, croup being primarily, by general belief, a local disease, and diphtheria a constitutional disease.

The following Table shows the number of deaths and the sex of the decedents in Rhode Island, from croup and from diphtheria, in each of the seven years, from 1858 to 1864 inclusive:

TABLE LIV.

YEARS.	CROUP.			DIPHTHERIA.		
	Males.	Females.	Total.	Males.	Females.	Total.
1858..................	35	34	69	1	5	6
1859......	37	21	58	10	10	20
1860....	27	30	57	24	43	67
1861..................	32	26	58	66	74	140
1862	34	39	73	31	50	81
1863	51	46	97	73	82	155
1864...........	48	57	105	67	93	160
Seven Years........ ..	264	253	517	272	357	629

Table LIV. has been continued from previous reports for the reason that comparisons of deaths and sex of decedents may be made, from year to year, from the first appearance of diphtheria in the State. It could not well be combined with Table LV., because the parentage of decedents prior to 1865 had not been presented in these Reports.

The aggregate number of decedents from diphtheria during the first five years of its prevalence in the State, were exactly the same as the total decedents from croup during the same period. During the succeeding two years, diphtheria had exceeded croup about fifty per cent.

The following Table gives the number, the sex and the *parentage* of the decedents from croup and from diphtheria, in Rhode Island, in each of the last sixteen years, from 1865 to 1880 inclusive:

TABLE LV.

YEARS.	CROUP.					DIPHTHERIA.				
		SEX.		PARENTAGE.			SEX.		PARENTAGE.	
	Number of Deaths.	Males.	Females.	American	Foreign.	Number of Deaths.	Males.	Females.	American.	Foreign.
1865	94	44	50	32	62	82	41	41	62	20
1866	53	26	27	22	31	64	26	38	36	28
1867	50	25	25	21	29	31	14	17	19	12
1868	30	13	17	14	16	20	8	12	11	9
1869	41	19	22	14	27	33	18	15	19	14
1870	53	29	24	25	28	33	17	16	18	15
1871	72	39	33	31	41	57	23	34	29	28
1872	66	37	29	17	49	48	24	24	35	13
1873	68	30	38	35	33	45	24	21	35	10
1874	65	39	26	38	27	59	30	29	37	22
1875	96	53	43	43	53	33	17	16	18	15
1876	102	50	52	42	60	159	77	82	69	90
1877	95	48	47	34	61	492	239	253	233	259
1878	93	45	48	43	50	435	224	211	201	234
1879	96	58	38	40	56	259	121	138	143	116
1880	66	32	34	27	39	152	73	79	75	77
Total, 16 years	1,140	587	553	478	662	2,002	976	1,026	1,040	962

The remarkable difference in the number of decedents one year with another, between croup and diphtheria, will hardly fail to be noticed. During the last 16 years, the largest number of deaths in any year from croup, was 102, in 1876, and the smallest number was 30, in 1868.

During the same time, the variation in the number of deaths from diphtheria, was from 20, in 1868, to 492, in 1877.

Diphtheria has declined largely in number of decedents since 1878, numbering only 152 in 1880.

SEX AND PARENTAGE.

During the twenty-three years, 1858 to 1880 inclusive, of the whole number of decedents from croup, 851 were males, and 806 were females; or 105.5 males to each 100 females.

Of the whole number of decedents from diphtheria during the the same period of time, 1,248 were males; and 1,383 were females; or 90.2 males to each 100 females.

The preponderance of males in the decedents from croup, and the preponderance of females in the decedents from diphtheria, will not fail to be observed.

In regard to parentage, it will be seen that the mortality from croup is the largest in that of foreign, and the mortality from diphtheria the largest in that of American parentage.

SEASON AND MORTALITY.

The influence of season in regard to mortality from croup and diphtheria, may be seen in the following Table, where these diseases may also be compared with scarlatina, to which they bear resemblance in some respects. The Table will give the whole number of deaths during the periods named, and the average monthly and quarterly percentages of deaths, from each disease:

Table LVI.

MONTHS.	CROUP. 1853–1879.		DIPHTHERIA. 1858–1879.		SCARLATINA. 1853–1879.	
	Number of Deaths.	Per cent.	Number of Deaths.	Per cent.	Number of Deaths.	Per cent.
January	237	12.43	238	9.25	491	11,63
February	204	10.70	171	6.63	453	10.73
March	165	8.65	194	7.54	418	9.90
First Quarter	606	31.78	603	23.42	1,362	32.26
April	135	7.07	145	5.64	350	8.29
May	94	4.91	162	6.30	382	9.04
June	91	4.80	165	6.40	346	8.19
Second Quarter	320	16.78	472	18.34	1,078	25.52
July	60	3.14	129	5.01	247	5.85
August	54	2.83	154	6.00	199	4.71
September	123	6.47	235	9.14	199	4.71
Third Quarter	237	12.44	518	20.15	645	15.27
October	203	10.64	342	13.34	274	6.50
November	261	13.68	334	12.99	366	8.68
December	280	14.68	302	11.76	496	11.77
Fourth Quarter	744	39.00	978	38.09	1,136	26.95
Totals	1,907	100.00	2,571	100.00	4,221	100.00

An examination of the preceding Table will show, that *season* has a very decided and unmistakable influence upon the production of mortality from the three named diseases, if not upon the prevalence of the same.

More extended comments and observations in relation to the influence of season, and the variableness of the influence in the production of mortality from the three different diseases, may be found in the preceding Registration Report (the twenty-seventh).

The following Table will show the statistics of scarlatina for each of the last twenty-six years, from 1855 to 1880 inclusive, the whole number of deaths in the State; the number, and percentage and sex of the decedents from scarlatina, and the number from scarlatina in each division of the State. It also shows, from 1865 to 1880 inclusive, the parentage of the decedents from scarlatina:

TABLE LVII.

YEARS.	Whole Number of Deaths.	SCARLATINA.											
				SEX.		PARENTAGE.		DIVISIONS OF THE STATE.					
		Scarlatina.	Per cent.	Males.	Females.	American.	Foreign.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.
1855......	1,846	71	3.8	41	30	......	....	22	......	1	6	42	.....
1856......	2,042	208	10.2	109	99	......	......	3	1	3	57	144	.....
1857.. ...	2,325	147	6.3	69	78	......	......	.....	20	47	47	32	1
1858... ..	2,616	234	8 9	118	116	......	......	5	11	75	61	72	10
1859......	2,270	71	3.1	34	37	......	...	5	2	4	14	45	1
1860......	2,686	64	2.4	31	33	......	......	4	3	7	17	17	16
1861......	2,927	57	1.9	24	33	......	......	2	2	7	9	28	9
1862.... .	2,591	47	1.8	25	22	......	......	3	4	3	19	14	4
1863......	3,207	91	2.8	40	51	......	......	1	...	23	24	33	10
1864... ..	3,360	266	8.0	120	146	......	....	1	19	19	80	141	6
1865......	3,405	255	7.5	130	125	134	121	33	17	3	86	108	8
1866......	2,970	28	0.9	15	13	12	16	5	....	8	12	3	......
1867.. ..	2,889	14	0.5	6	8	10	4	1	......	1	2	10	......
1868......	2,912	93	3.2	47	46	32	61	2	3	3	34	50	1
1869......	3,382	286	8.4	126	160	128	158	17	23	12	72	138	24
1870......	3,238	75	2.3	37	38	28	47	1	6	3	22	35	8
1871......	3,344	66	1.9	41	25	31	35	1	3	1	37	21	13
1872......	4,247	53	1.2	22	31	22	31	.....	1	4	27	19	2
1873......	4,403	287	6.5	124	163	163	124	4	2	42	80	132	27
1874.. ...	4,229	462	10.9	231	231	176	286	27	17	1	133	268	16
1875.. ...	4,317	185	4.3	85	100	121	64	8	30	3	35	94	15
1876......	4,116	80	1.9	34	46	42	38	3	2	7	21	35	12
1877......	4,450	62	1.4	26	36	29	33	14	4	3	21	12	8
1878......	4,441	86	1.9	41	45	35	51	3	5	3	14	57	4
1879... ..	4,472	311	7.4	164	147	130	181	3	6	4	37	255	6
1880......	4,829	468	10.0	215	253	216	252	22	30	11	143	243	19
Totals, 26 Years..	87,514	4,067	4.6	1,955	2,112	1,309	1,502	190	211	298	1,100	2,048	220

DISEASES OF THE HEART.

The number of deaths reported in Rhode Island, in 1880, from diseases of the heart, was 231. It is the largest number ever reported in

Rhode Island from this cause, and was the fifth most fatal disease in the order of largest number during 1880.

The following Table shows, for each of the last sixteen years, 1865 to 1880 inclusive, the whole number of deaths in the State; the number and percentage, and the sex and parentage of the decedents from diseases of the heart, and the number of the same in each division of the State:

TABLE LVIII.

YEARS.	Whole Number of Deaths.	DISEASES OF THE HEART.											
		Diseases of the Heart.	Per cent.	SEX.		PARENTAGE.		DIVISIONS OF THE STATE.					
				Males.	Females.	American.	Foreign.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.
1865	3,405	98	2.88	51	47	65	33	6	5	8	27	47	5
1866.......	2,970	115	3.87	58	57	90	25	7	8	10	41	40	9
1867......	2,889	114	3.94	67	47	81	33	4	9	7	37	49	8
1868......	2,912	116	3.96	58	58	79	37	5	8	12	35	52	4
1869......	3,382	128	3.78	75	53	79	49	2	13	11	36	62	4
1870	3,238	117	3.61	77	40	77	40	4	10	8	35	59	1
1871. . ..	3,344	144	4.30	78	66	91	53	4	7	8	42	77	6
1872......	4,247	189	4.45	104	85	119	70	5	9	10	59	93	13
1873	4,403	189	4.29	83	106	122	67	4	11	14	48	101	11
1874......	4,229	214	5.06	109	105	150	64	6	6	28	50	106	18
1875......	4,317	186	4.31	84	102	113	73	2	13	22	49	88	12
1876......	4.116	166	4 03	86	80	109	57	9	11	10	38	86	12
1877	4,450	182	4.09	94	88	110	72	3	7	9	57	93	13
1878......	4,441	166	3.73	88	78	109	57	5	11	15	38	83	14
1879......	4,472	202	4.78	114	88	127	75	8	20	16	38	111	9
1880......	4,829	231	5.03	125	106	146	85	9	21	29	59	104	9
Totals, 16 years..	61,644	2,557	4.15	1,351	1,206	1,667	890	83	169	207	689	1,251	148

The difference in the percentage of males and females, and also of American and foreign parentage, of the decedents from diseases of the heart is quite noteworthy.

Of the 2,557 persons deceased from diseases of the heart, in the last sixteen years, 1,351 were males, and 1,206 were females; or 52.83 males and 47.17 females in each 100; or 112.0 males to each 100 females.

The difference in parentage is much more noticeable than that of sex.

Of the 2,557 decedents from disease of the heart, there were 1,667 of American parentage, and 890 of foreign parentage.

The proportions would therefore stand as follows:

To every 100 of foreign parentage there were about 190 of American; or 65.2 American, and 34.8 of foreign parentage in each 100 deaths.

The following Table shows the number of decedents from diseases of the heart, in each divisional period of life, in each of the last sixteen years:

Table LIX.

YEARS.	Under 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 and over.	Not stated.
1865	14	4	6	7	22	17	19	9	....
1866	18	8	14	17	10	23	21	4	....
1867	11	11	10	13	22	16	27	4	....
1868	15	5	13	11	14	28	25	5	.....
1869	21	4	14	18	20	22	21	7	1
1870	19	6	11	13	20	21	23	3	1
1871	9	12	10	19	23	36	28	6	1
1872	27	12	22	19	31	36	29	13	.....
1873	19	11	28	18	25	35	42	9	2
1874	20	16	26	21	27	50	40	12	2
1875	14	16	25	20	32	29	41	9	.....
1876	14	10	15	19	20	38	39	10	1
1877	15	11	20	18	27	45	33	13	.....
1878	16	8	18	16	26	36	35	11	....
1879	19	9	13	25	33	51	36	16	.....
1880	15	10	18	23	38	49	49	28	1
Totals, 16 years	266	153	263	277	390	532	508	159	9

The results of sixteen years registration, with record of ages of decedents from diseases of the heart, show in periods of twenty years of life, the following percentages:

Under 20 years of age	10.4 per cent.
Between 20 and 40	16.3 per cent.
Between 40 and 60	26.2 per cent.
Between 60 and 80	40.6 per cent.
Over 80	6.2 per cent.
Not stated.	0.3 per cent.

It will be seen that nearly one half of all the deaths from diseases of the heart, were of persons over sixty years of age.

PNEUMONIA AND CONGESTION OF THE LUNGS.

The following Table shows, for each of the last sixteen years, the whole number of deaths reported in Rhode Island; the number and the percentage, with the sex and the parentage of the decedents from pneumonia and congestion of the lungs, and the number in each year, in each division of the State:

TABLE LX.

YEARS.	Whole Number of Deaths.	PNEUMONIA AND CONGESTION OF THE LUNGS.											
				SEX.		PARENTAGE.		DIVISIONS OF THE STATE.					
		Pneumonia, &c.	Per cent.	Males.	Females.	American.	Foreign.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.
1865	3,405	175	5.1	80	95	110	65	8	11	21	49	74	12
1866	2,970	193	6.5	94	99	127	66	13	17	13	59	81	10
1867	2,889	172	5.9	68	104	103	69	8	12	12	56	68	16
1868	2,912	191	6.6	99	92	120	71	9	5	16	54	92	15
1869	3,382	190	5.6	104	86	110	80	7	10	10	63	88	12
1870	3,238	182	5.6	102	80	96	86	6	12	15	55	78	16
1871	3,344	218	6.5	104	114	129	89	12	21	11	68	85	21
1872	4,247	229	5.4	119	110	125	104	11	1	9	74	120	14
1873	4,403	234	5.3	127	107	143	91	11	9	10	65	123	16
1874	4,229	250	5.9	118	132	143	107	6	13	7	73	136	15
1875	4,317	400	9.3	199	201	243	157	14	27	25	105	198	31
1876	4,116	339	8.2	164	175	162	177	13	23	16	97	163	27
1877	4,450	226	5.1	104	122	127	99	10	7	14	81	98	16
1878	4,441	317	7.1	143	174	176	141	10	11	18	110	140	28
1879	4,472	311	7.4	148	163	163	148	7	15	15	103	156	15
1880	4,829	364	7.9	180	184	177	187	26	16	18	92	192	20
Totals, 16 years	61,644	3,991	6.5	1,953	2,038	2,254	1,737	171	210	230	1,204	1,892	284

The number of decedents from pneumonia and congestion of the lungs, during 1880, was larger than in any previous year, with the exception of 1875. The proportion of the sexes was nearly equal, and the difference in the parentage was considerably less than the average.

The number of decedents in Bristol county was nearly double that of any previous year, and nearly four times as many as in 1879. There was an increase of 20 per cent. over the previous year in Newport county; about 23 per cent. in Providence city; and 33 per cent. in Washington county.

The following Table shows, for each of the last sixteen years, the number of decedents in Rhode Island from pneumonia and congestion of the lungs, in each of the several periods of life:

TABLE LXI.

YEARS.	Under 5.	5 to 10.	10 to 15.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 and over.	Not stated.
1865	65	4	2	....	14	11	15	17	21	21	5	....
1866	57	4	4	5	12	10	14	21	25	32	9	....
1867	57	9	2	3	10	11	13	16	25	13	12	1
1868	70	4	3	3	15	8	16	13	19	27	13	....
1869	64	11	1	2	11	12	9	28	25	16	11	....
1870	84	6	5	4	6	7	8	14	20	19	8	1
1871	71	7	2	7	10	17	16	16	35	17	19	1
1872	83	5	1	7	17	20	19	22	24	19	11	1
1873	105	4	8	3	10	14	16	17	24	23	10	....
1874	76	9	4	6	17	17	25	21	40	27	8	....
1875	120	9	3	8	22	30	35	39	61	43	28	2
1876	116	5	4	3	20	20	32	35	48	39	17	....
1877	79	2	....	7	15	15	24	27	22	24	9	2
1878	115	9	4	10	14	17	28	20	42	45	13	....
1879	102	8	1	3	14	27	26	35	38	38	19	....
1880	95	18	3	16	14	33	37	46	47	43	12	....
Total	1359	114	47	87	221	269	333	387	516	446	204	8

The very great increase of mortality from pneumonia, in persons from five to ten years of age, is quite remarkable. The average of fifteen years previous to 1880, was 6.4 decedents from five to ten years of age. It will be seen that the number in 1880, that is, 18, is nearly three times the average of the preceding years.

The same remarks will apply equally well to the period of life between fifteen and twenty, in which the proportionate increase of mortality is even greater.

TYPHOID FEVER.

The number of deaths in Rhode Island, in 1880, reported under the general title of "Fevers," was 158. This number is 44 more than in 1879, and 8 more than in 1878. The number includes all reported under the following specific terms: "Bilious," 4; "Remittent," 3; "Typhoid or Typhus," 137; "Yellow Fever," 1; "Fever," 13. It is probable that *nearly* all fevers occurring in Rhode Island are essentially typhoid, the type being modified by a variety of circumstances. Of course the term is not designed to cover all febrile states, dependent on malaria or a variety of acute and chronic inflammations.

The following Table shows, for each of the last sixteen years, the whole number of deaths in the State; the number and the percentage, and the sex and parentage of the decedents from fevers, and the number in each division of the State:

TABLE LXII.

YEARS.	Whole Number of Deaths.	TYPHOID FEVER.											
		Typhoid Fever.	Per cent.	SEX.		PARENTAGE.		DIVISIONS OF THE STATE.					
				Males.	Females.	American.	Foreign.	Bristol County.	Kent County.	Newport County.	Providence County, Towns.	Providence City.	Washington County.
1865......	3,405	229	6.4	114	115	149	80	8	17	22	82	79	21
1866......	2,970	150	5.0	73	77	82	68	7	5	32	54	45	7
1867......	2,889	119	4.1	60	59	84	35	9	10	17	47	31	5
1868.	2,912	84	2.9	45	39	57	27	4	5	7	30	23	15
1869	3,382	101	3.0	53	48	79	22	7	7	1	37	33	16
1870... ..	3,238	153	4.7	66	87	80	73	5	11	14	57	49	17
1871......	3,344	125	3.7	60	65	69	56	2	8	10	41	51	13
1872......	4,247	179	4.2	87	92	91	88	4	12	6	75	65	17
1873......	4,403	172	3.9	73	99	113	59	4	9	9	61	56	83
1874......	4,229	117	2.8	57	60	56	61	1	10	3	37	58	8
1875......	4,317	147	3.4	73	74	90	57	1	4	6	49	69	18
1876......	4.116	126	3.0	65	61	71	55	5	9	13	44	33	22
1877.. ...	4,450	134	3.0	63	71	65	69	8	10	8	52	44	12
1878......	4,441	150	3.4	68	82	77	73	13	15	7	62	58	14
1879......	4,472	114	2.7	47	67	63	51	4	13	6	44	40	7
1880......	4,829	158	3.4	74	84	94	64	8	12	5	66	52	15
Totals, 16 years..	61,644	2,258	3.6	1,078	1,180	1,320	938	90	157	166	838	786	240

It will be seen that the number of decedents from "Fever," in 1880, was not only larger than in 1879, but the percentage of mortality from that cause, to all named causes of death, was also considerably larger.

SEX.

The difference in regard to sex was less than in the previous year, 113.5 females to each 100 males in 1880; as against 142.5 females to each 100 males in 1879. The average of the last sixteen years is about 109 females to each 100 males; or 52.2 females and 47.8 males in each 100 decedents.

PARENTAGE.

In relation to parentage the difference in number was quite unusual.

Of the decedents from "Fever," in 1880, there were 94 of American parentage, and 64 of foreign; or 146.8 of American to each 100 of foreign; or 59.5 of American and 40.5 of foreign parentage in each 100 decedents.

The following Table shows the number of decedents from fevers, in each division of ages, in each of the last sixteen years, in the State of Rhode Island:

TABLE LXIII.

TYPHOID FEVER.	Periods of Life.										
YEARS.	Under 10.	10 to 15.	15 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 and over.	Not stated.
1865	35	18	46	54	30	14	18	7	5	2	...
1866	23	10	21	26	21	16	9	14	10	....	...
1867	17	6	23	33	12	11	8	4	2	2	1
1868	10	7	10	21	8	8	10	4	5	...	...
1869	10	8	14	28	9	7	9	8	6	2	...
1870	15	13	28	39	16	20	7	7	6	1	...
1871	13	10	20	28	18	16	9	4	5	2	...
1872	17	18	34	54	20	9	12	11	3	1	...
1873	27	12	34	31	25	13	13	7	8	2	...
1874	10	14	26	32	9	5	10	3	6	2	...
1875	23	14	19	43	18	10	10	6	4	....	...
1876	21	10	15	24	14	9	6	16	6	3	2
1877	22	13	13	36	20	8	5	7	2	2	1
1878	17	16	27	47	13	11	12	2	3	2	...
1879	19	7	14	26	15	6	3	12	8	3	1
1880	25	12	24	43	23	12	10	5	3	....	1
Totals	304	188	368	575	271	175	151	117	82	24	6

During the year 1880, there were a larger number of decedents from fever, in every period of life under sixty years, than in 1879.

This is seen in a very marked degree under the age of thirty, that is, 104 decedents in 1880 against 66 in 1879. Typhoid fever is, however, a disease which, in the average of years, affects much the largest number of persons in the middle periods of life.

COMPARATIVE RESULTS.

The following Table shows the percentage of total mortality from several prominent causes, as reported in 1880, in the whole State, and in the several divisions of the State; and also the percentages of the same causes in the whole State, in 1878 and 1879:

TABLE LXIV.

CAUSES OF DEATH.	Bristol County.	Kent County.	Newport County, Towns.	Newport City.	Providence County, Towns.	Providence City.	Washington County.	Whole State, 1880.	Whole State, 1879.	Whole State, 1878.
Accidents (all kinds)	1.91	5.81	3.81	2 28	2.65	3.16	1.48	3.51	2.43	2.89
Apoplexy and Paralysis	8.61	4.41	10.47	5.05	4.94	3.78	4.83	4.67	5.21	4.45
Brain, Diseases of	1.44	2.04	2.88	3.66	3.83	3.89	2.16	3.44	3.73	3.28
Cancer	2.28	3.40	1.90	4.54	1.80	3.30	1.49	2.72	2.96	2.82
Cholera Infantum	6.22	3.75	2 86	3.20	6.47	4.84	7.41	5.43	3.81	3.97
Consumption	9.09	15.46	11.43	10.06	13.15	15.62	12.22	14.02	15.09	15.98
Convulsions and Fits	1.92	4.48	......	4.12	3.77	2.38	1.49	2.88	2.47	2.65
Croup	1.44	1.02	.95	1.37	1.39	1.45	2.21	1.45	2.28	2.20
Debility	4.30	1.68	1.90	3 73	5.83	1.31	2.59	3.09	2.35	1.91
Diarrhœa	.48	.34	.....	4.56	1.67	1.45	1.48	1.52	1.26	1.25
Diphtheria	1.44	2.05	......	.91	1.38	2.94	6.30	3.40	6.14	10.28
Dysentery	1.44	1.71	.....	.....	.56	.58	......	.61	1.04	.95
Fevers	3.82	4.09	.95	1.37	4.67	2.49	5.55	3.37	2.70	3.94
Heart, Diseases of	4.31	7.20	5.72	10.51	4.13	5.06	3.33	5 03	4.78	3 92
Hooping Cough	......	......	......	.91	.42	.52	.37	.44	1.02	1.28
Hydrocephalus	1.43	1.37	1.91	.45	.35	1.45	.38	1.01	1.36	1.65
Kidneys, Diseases of	.48	1.71	1.92	3.64	1.88	2.24	.74	2.02	1.88	1.89
Liver, Diseases of	1.91	1.03	1.92	2.73	.83	1.23	1.11	1.20	1 17	1.06
Marasmus	1.44	......	.95	1.80	.90	1.79	.....	1.27	1.16	1.30
Pneumonia and Congestion of the Lungs	12.45	5.45	6.67	5.01	6.43	9.36	7.40	7.90	7.37	7.49
Scarlatina	10.51	10.25	3.80	3.20	9.94	11.78	7.05	9.99	7.37	2.03

Table LXIV. presents a very comprehensive summary of the proportions which the mortality from several of the most prominent causes of death, bear to the whole number of deaths from specified causes.

It will be seen that great differences in the percentages of the various causes of death, occur in the different divisions of the State.

These differences would be expected in contagious diseases, which might prevail in one locality during one year, and in another locality in another year.

But differences are also found in the causes of death which might reasonably be supposed to occur, not only in the same proportion in the same localities from year to year, but also in about the same proportion in all localities.

In the above Table, however, it should be noticed that the percentages are in proportion to number of deaths in each locality or division of the State, and not in proportion to the population.

The number of deaths reported in 1880, was larger than in any preceding year. The same number of deaths from any cause during that year, would, therefore, have a smaller percentage than during any preceding year.

In the three last columns of the Table, may be found comparisons of the percentages of the different causes of death, to whole number of deaths from known causes, for the three years 1878, 1879 and 1880.

It will be seen that there is considerable variation from year to year, in the proportion of the same disease.

Cholera infantum shows a considerably larger proportion in 1880, than in the two preceding years, notwithstanding the increased number of deaths from other causes.

Consumption shows a smaller percentage than in the two previous years, because of the increased whole number of deaths from all causes, although the number of deaths from consumption was larger in 1880 than in 1879.

Diphtheria has a largely diminished percentage, while scarlatina has a percentage considerably in excess of previous years.

REGISTRATION RETURNS.

The returns of deaths, as recorded in the different towns in the State in the year 1880, are without doubt more complete than during any previous year of registration in Rhode Island. That is to say, there were fewer deaths occurring in 1880, in the towns, of which no report or return was made to the town or city clerk. It is also to be remarked, that the returns of registration made to the office of the state board of health, or state registrar, by the town clerks, have been more uniform in the fullness and completeness of statement in relation to all the facts and circumstances connected with the different events of birth, marriage and death, as required by law.

There is necessarily considerable delay in publishing the registration returns of any year, for the reason that they are in a considerable proportion collected under the supervision of the town or city clerks, during the months of January and February in the year following that in which the events occurred. Nearly half of the following year sometimes elapses before the returns from all the towns are received by the state registrar, and therefore the work of classifying and tabulating is delayed. That is a labor involving great care and patience. The picking out of the different facts connected with each separate event, and recorded in hundreds of pages of manuscript, and tabulating the kinds and numbers of the same thus ascertained, under the proper classifications, is a work of months.

It will be understood, therefore, that promptness of return, and uniformity in the modes of filling the blanks, and making the annual returns to the state registrar is of great importance in the way of facilitating the work.

The following circular was sent at the close of the year 1881, to the town clerks of the several towns:

OFFICE OF THE STATE REGISTRAR,

PROVIDENCE, December, 1881.

To the Town Clerk of the Town of ——— *:*

DEAR SIR.—It is quite desirable that the returns of births, marriages and deaths from the several towns in the State should be as complete and accurate as possible. It is known that some births and deaths occur in the State that fail to be put on record. Among other causes of such failure, the most prominent is the removal of the families in which such births and deaths occur, out of the town in which they occurred, before the collector of returns of births and deaths canvasses the town for them. This defect in regard to births can be greatly remedied by a careful inquiry on the part of every collector of returns in regard to every child of one year old and less, found, *and to be found*, in the town which he is canvassing. When the collector finds a child whose birth occurred in some other town than the one he is canvassing, he should make the same inquiries as in other cases, and record on same blank returns; the said returns to be put in the hands of the town clerk as in other cases, and recorded by him in the town record, the same as of those whose births occurred in the town, with the exception of stating the town where the birth occurred, and the State, if occurring in another State.

After the town clerk has copied the town record of births on the large registration returns, and forwarded the same to the Secretary of the State Board of Health, or State Registrar, he should then send the *collectors* small returns of births that have occurred in other towns, to the town clerks of the towns where the births occurred.

The idea is, that the losses and gains in number in the different towns will thereby be best equalized, and the whole number of births in the State more fully ascertained.

The same idea will hold good, not only as between towns, but also as between States. The children born in other States during the year preceding the canvass, and found in this State at the time of the canvass, will be about the same in number as of those born in this State and removed to another State before the canvass is made.

All children then, found in any town, whose birth occurred during the preceding year, will be enrolled in the town record of births of the town where residing at the time the canvass is made in January, and be forwarded to the State Registrar the same as those born in the town.

The collector should always be instructed to obtain returns of *all* deaths, which may come to his knowledge, whether previously reported to the town clerk or not, and if he obtains information and makes returns of deaths that occurred in other towns, and in families removed to and residing in the town which he is canvassing, at the time the returns are collected, the said returns should be recorded in the town where collected, and then transmitted to the town in which the death occurred, as in the case of births. The fees will be the same as in the ordinary returns.

Physician's certificate of cause of death should always be obtained when possible.

The necessity of exercising great diligence in obtaining correct information in regard to the vital statistics of the towns, should be strongly impressed on the minds of canvassers.

The registration returns of births, marriages and deaths which occurred in the several towns of the State, during the past year, and returnable to this office, should have the returns of each class by itself, as heretofore, that is, the births, marriages and deaths on separate blanks, and the sheets *stitched*, or otherwise fastsned together in regular order as they come in the quire, and the name of the class, whether births, marriages or deaths, and name of the town from which they are sent, should be written on the first outside page.

Yours respectfully,

CHAS. H. FISHER,

State Registrar.

MARRIAGES.

The radical change in the marriage laws of Rhode Island, enacted during the January session of the General Assembly in 1881, enlarged the duties of the town and city clerks in relation to the proceedings preliminary to the solemnization of the marriage ceremony, and added the item of divorce to the returns. The requirements of clergymen and others authorized by law to join persons in marriage, were also increased, and more definite restrictions imposed.

It was enacted that the new law should go into effect on the first day of July, 1881.

In order that the town clerks should be enabled to comply with the new law, it was necessary to devise a new set of blanks to meet the varying requirements.

The necessary blanks comprising the record of *intention* of marriage, the certificate of the town or city clerk or city registrar, of the fact of such intention having been recorded, and the certificate of consent of parent or guardian to marriage of minor were duly prepared and forwarded in sufficient numbers to all the town and city clerks in the State, previous to the first day of July.

The following are the forms of the blanks then sent and now in use:

Intentions of Marriage Recorded in the Town of R. I.

DURING THE YEAR 188

No.

1. **Full name of Groom ?**..
2. Place of Residence?..
3. Age in years?.................... 4. Color?..........................
5. Occupation?..
6. Place of birth?..
7. Father's name..
8. Mother's Maiden name?..

Parents' Birth-places? Fa..............................Mo..............................

Parents' Occupations? Fa..............................Mo..............................

9. **Full name of Bride ?**..

(Maiden name?)..

10. Place of residence?..
11. Age in years?.................... 12. Color?..........................
13. Place of birth?..
14. Father's name?..
15. Mother's Maiden name?..

Parents' Birth-places? Fa..............................Mo..............................

Parents' Occupations? Fa..............................Mo..............................

16. No. of Marriage? Of Groom?................ Of Bride?................
17. Widower, Widow, or Divorced? Groom?............ Bride?............

Date of record?..

To be married by..............................at..............................

Name of Applicant?..

TOWN CLERK'S OFFICE,

....188....

No............

I hereby certify that the intention of marriage between

...................................and...................................

is duly recorded in this office.

....*Town Clerk.*

CERTIFICATE OF MARRIAGE.

STATE OF RHODE ISLAND.

I Hereby Certify, *That*..*and*

....*were joined in Marriage by me, in*

accordance with the laws of the State of Rhode Island, in the Town of......

..........*this*..........*day of*..........*A. D. 188*

Attest:..

....

Witnesses to the Marriage,..

....

N. B.—The clergyman or other person solemnizing the marriage is required to sign this certificate, and return it to the Clerk or Registrar of the town or city in which the marriage takes place, *on or before the second Monday of the month succeeding the date of the marriage.*

The laws of Rhode Island require at least two witnesses to be present at a marriage, in addition to the parties and the clergyman officiating. Give the names of two who were present.

N. B.—The town or city Clerk, or person officiating, will require the signatures of the Groom and Bride to their certificate, and name of witness thereto, on the reversed page. If Groom or Bride has been divorced, write "Divorced" after No. of marriage, at No 14.

When a marriage is entered in the town record of marriages, if either party has been divorced, write "Divorced" in column No. of Marriage, after the number 1st, 2d, &c., is stated.

RETURN OF A MARRIAGE.

STATE OF RHODE ISLAND.

1. **Full** name of **Groom?** ....
2. Place of Residence? ....
3. Age in years? ....
4. Occupation? ....
5. Place of birth? ....
6. Father's name? ....
7. Mother's Maiden name? ....

Parents' Birth-place? .... Fa .... Mo ....

Parents' Occupation? .... Fa .... Mo ....

8. **Full** name of **Bride?** ....

(Maiden Name if a Widow?) ....

9. Place of Residence? ....
10. Age in years? ....
11. Place of birth? ....
12. Father's name? ....
13. Mother's Maiden name? ....

Parents' Birth-place? .... Fa .... Mo ....

Parents' Occupation? .... Fa .... Mo ....

14. No. of the Marriage?... Of Groom..........Div. Of Bride..........Div.
15. Color of the parties? ....

N. B.—At No. 15, state whether white, black, or mulatto. At No. 14, state whether this marriage is the 1st, 2d, 3d, &c., marriage of each. ☞ Give the middle names in FULL. ☜

.... *188*

We, the Groom and Bride named in the above Certificate, hereby certify that the information given is correct to the best of our knowledge and belief.

.... *Groom.*

.... *Bride.*

Signed in presence of ....

....

N. B.—The above blanks must be filled, and the certificate must be signed by both Groom and Bride, and must be given to the person about to solemnize the marriage, BEFORE the marriage can be legally solemnized in the State of Rhode Island.

CERTIFICATE OF CONSENT TO MARRIAGE OF MINOR.

....*R. I*.................*188*

Father,
I.................................... ...., *Mother,* ....*of*
Guardian,

....*hereby give my consent to*

h........*marriage with*................... ....

of..............................

....

Witness........... ....

At the same time, desiring to bring to the attention of all the clergymen and other persons authorized to join persons in marriage in Rhode Island, a large number of whom had no knowledge of any change in the laws in relation to marriage, or a very imperfect knowledge if any, and also to remind the town clerks of the enlargement of their duties, the following circular was sent to all the town clerks and clergymen in the State:

(CIRCULAR K.)

OFFICE OF SECRETARY OF THE STATE BOARD OF HEALTH.

DEAR SIR:

The recent radical change of the law in relation to marriage seems to require more special notice than is given by the general report of legislative proceedings, and the publication of the Acts passed by the General Assembly.

The following rules will have reference to the duties of clergymen and town or city clerks, or city registrar, and are in conformity with the present status of the marriage law:

1. Persons may marry within the degrees of consanguinity heretofore allowed by law.

2. The marriage of idiots, lunatics, and of persons having a husband or wife living, is unlawful and absolutely void.

3. There is no legal bar to the intermarriage of whites and persons of color.

4. Any ordained minister or elder of any religious denomination, or minister of any society professing to meet for religious purposes and incorporated and sustaining a minister publicly ordained, who shall be *domiciled* in this State, and either Justice of the Supreme Court, may join persons in marriage in any town in the State; also wardens in the town of New Shoreham. It will be seen that clergymen from other States *cannot solemnize marriages* in Rhode Island.

5. No minister, elder, magistrate or warden shall join persons in marriage, unless such persons, if residents of this State, shall first present a certificate properly executed and signed by the town or city clerk or city registrar of the town or city in which such persons shall reside, and if not residents of this State, then from the town or city clerk or registrar of the town or city in which the marriage shall be solemnized, to the effect that the said town or city clerk or registrar, has duly recorded the *intention* of marriage between the parties named in the certificate, according to law; and the certificate may also bear the signatures of the Groom and Bride and witness thereto.

6. No marriage shall be solemnized if lawful objection is made thereto, until such lawful objection is removed.

7. The solemnization of marriage shall be in the presence of two witnesses at least, besides the minister or other person officiating, whose signatures shall be appended to the certificate of marriage.

8. Marriages solemnized in accordance with the forms, rites and ceremonies of the various religious denominations respectively, are valid if otherwise in accordance with law.

9. Every person authorized to join persons in marriage shall certify the time when and the place where the marriage shall have been solemnized, and shall on or before the second Monday of every month, return the certificate of every marriage solemnized by him during the last preceding month, to the town or city clerk or registrar of the town or city in which such rite shall have been performed.

10. Upon application, the town or city clerk or city registrar of the town or city in which one or both of the persons intending marriage shall reside, shall fill out a *blank return of marriage* in the form provided by the Secretary of the State Board of Health, and shall certify on the reversed side, in the blank provided, that the *intention* of marriage between the parties named as groom and bride has been duly recorded in his office.

11. No town or city clerk or city registrar shall issue any such certificate to any minor or person under guardianship, unless the consent in writing of the parent or guardian of such person shall have been first obtained thereto. The legal minority of both sexes terminates at the age of twenty-one.

12. The town or city clerk or city registrar, shall, after stating the No. of marriage, whether 1st, 2d, or 3d, etc., at No. 14, on the return of marriage filled out by him, also state on the same line whether either the groom or bride or both has or have been divorced, by writing the word—divorced, or the contraction—div., closely following the No. of marriage.

13. The town or city clerk or city registrar shall obtain the facts in relation to divorce, and to minority, and shall have power of administering an oath relative thereto, and may require the signatures of the groom and bride, one or both at his discretion, at the bottom of the return which he will fill out and certify to. But if the signatures of the groom and bride are not required by him, they must be required previous to marriage by the person performing the ceremony.

Respectfully,

CHAS. H. FISHER,

State Registrar and Sec. of the State Board of Health.

June 21st, 1881.

REPORTS OF MOST PREVALENT ACUTE DISEASES.

Attention in regard to the reasons for desiring monthly reports of the most prevalent acute diseases, from all the towns in the State, is directed to remarks in the Second Annual Report of the Board (1879) pages 148 to 156 inclusive, and Third Report (1880) pages 154–156 and 169–170.

The reports during 1881 have been about the same in general character and in detail, as those of the previous year.

Some of the correspondents have continued to report with a fullness and promptness, that have given great satisfaction, and are worthy of much commendation. Others have been dilatory, and a few quite irregular and uncertain.

The returns of diseases prevalent have, however, covered all parts of the State during nearly every month in the year, with perhaps the exception of the western portions of the towns of Coventry and West Greenwich, and the towns of New Shoreham, and Jamestown.

The return blank used during 1881 was nearly the same as that used during 1880, and was printed on postal card in form as follows:

Return of Diseases in.... .. ..
and vicinity, during the month of................1881

Any disease prevalent, not on the list may be added in writing. In the column order of prevalence, the figure 1 will signify the disease affecting the largest number, figure 2 next largest, and so on, figure 0. that no cases are known. In column of severity or type, s. will signify severe a. average, and m. mild. In column of general sickness, a. will signify an average with other years; figures with sign + attached so much per cent. increase; with sign —, so much decrease. Please add name or initials, and send at end of each month.

	Order of prevalence.	Form or Type.	General Sickness.
Bronchitis.			
Catarrhal Influenza......			
Cerebritis...............			
Cholera Infantum.......			
Cholera Morbus.........			
Croup Membranous......			
Croup Spasmodic........			
Diphtheria..............			
Diarrhœa...............			
Dysentery...............			
Fever Typhoid..........			
Fever Intermittent.			
Meningitis Cerebral......			
Measles.................			
Pharyngitis.............			
Pneumonia...			
Pleurisy................			
Rheumatism.............			
Scarlet Fever...........			
....			
....			
....			
....			

....*M. D.*

Summary of Reports of the most prevalent acute diseases in the several towns during

JANUARY, 1881.

Acute Diseases NAMES.	Of Brain.	Of Nasal Passages.	Of Throat.	Of Bronchiæ.	Of Lungs.	Croup.	Diphtheria.	Dysentery and Diarrhœa.	Erysipelas.	Hooping Cough.	Measles.	Mumps.	Rheumatism.	Scarlatina.	Typhoid Fever.
Barrington	....	2a.	3a.	1a.	5a.	....	....	....	....	....	....	....	4m.	6m.	....
Warren	....	4a.	5s.	1a.	....	7a.	6a.	....	....	....	....	....	2a.	3a.	....
Coventry	....	1a.	2a.	....	4a.	....	5m.	....	....	....	....	....	....	3a.	....
East Greenwich	....	1a.	....	3a.	2s.	....	4m.	....	....	....	....	....	....	5m.	....
Warwick	....	....	....	3m.	1a.	5m.	4m.	....	....	....	6m.	....	7a.	2a.	....
Little Compton	....	2m.	....	1m.	3s.	5m.	....	....	....	....	6s.	....	4s.	....	....
Middletown	....	1a.	3m.	....	....	....	....	....	....	....	2a.	....	....	....	....
Portsmouth	....	2a.	....	1a.	....	....	....	....	....	....	3a.	....	....	....	....
Tiverton	....	5m.	3a.	2a.	4a.	....	....	....	....	....	1a.	....	....	....	....
Newport City	....	2a.	4a.	5a.	....	....	....	....	....	7a.	1a.	....	3a.	....	6a.
Cranston	....	2a.	....	1a.	5a.	....	....	....	....	....	....	....	3a.	4a.	....
Cumberland	....	5a.	1a.	3a.	4a.	....	6a.	7m.	....	....	8m.	....	2a.	9m.	....
Johnston	....	1a.	5a.	2a.	3s.	6a.	5a.	....	....	....	....	....	4m.	....	....
Lincoln	8a.	....	1a.	2a.	3a.	....	7a.	6m.	5m.	....	....	....	4a.	....	....
North Smithfield	....	2m.	4a.	3a.	....	....	....	....	....	....	1m.	....	5a.	....	....
Pawtucket	....	4a.	2a.	1m.	3a.	....	7m.	....	6m.	....	....	....	5a.	....	....
Seituate	....	1a.	3s.	2m.	4a.	....	....	....	....	....	....	....	5a.	....	....
Woonsocket	....	2m.	3s.	4m.	....	5m.	....	....	....	....	1m.	....	6a.	....	....
Providence City	9a.	1a.	4a.	2m.	3s.	5a.	6a.	....	7a.	....	....	....	....	8m.	10a.
Hopkinton	....	1s.	2s.	3a.	....	4m.	5m.	....	....	....	....	....	6a.	7s.	....
North Kingstown	....	1a.	....	3a.	2a.	....	5m.	....	....	....	....	....	4m.	....	....
Richmond	....	2a.	5m.	3s.	4a.	....	2a.	....	....	....	....	....	....	6a.	....
Westerly	....	3s.	6a.	2a.	5a.	4a.	1a.	....	....	....	....	....	7a.	8s.	....

Figure 1, in the different columns of the Table, indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity; s. signifying severe, a. average, and m. mild. Towns not on the list in the Table failed to make returns.

Summary of Reports of the most prevalent acute diseases in the several towns during

FEBRUARY, 1881.

TOWNS.	Acute Diseases														
	Of Brain.	Of Nasal Passages.	Of Throat.	Of Bronchiæ.	Of Lungs.	Croup.	Diphtheria.	Dysentery and Diarrhœa.	Erysipelas.	Measles.	Mumps.	Rheumatism.	Scarlatina.	Typhoid Fever.	Intermittent Fever.
Barrington		2a.	1m.	5a.						4m.			3a.		
Warren		3a.	7a.	4a.		5s.	6a.			2m.		8a.	1s.		
Coventry		2a.			1a.								3m.		
East Greenwich		1a.		3a.	2a.			5s.				4m.	2m.		
West Greenwich		1a.		2a.	3m.							4m.			
Warwick		3a.		4m.	1a.								2m.		
Little Compton	1m.		3a.	2a.	1a.					2a.		4a.			
Portsmouth		2a.	4m.	3m.	1m.										
Tiverton		1s.	4a.	3a.	2a.							5m.			
Newport City		1a.	4m.	2a.	3a.							5m.			
Cranston		2m.	3m.	1a.	5m.	4m.									
Cumberland		1m.	6s.	2a.	5s.	3m.				4a.		7a.			
East Providence		1m.	3a.	2m.	4a.		7m.					5m.	6m.		
Johnston		1a.	2m.	3a.	5m.	4a.	6m.						5m.		
Burrillville		2a.	4m.	1a.	3a.										
Foster		4s.		2m.	1s.							3a.	6a.	5a.	
Lincoln			2a.	1s.	5a.			6m.	4a.	7m.		3a.		4a.	8a.
North Providence		1m.		3a.	2a.		5m.						4a.		
North Smithfield		3m.	2a.	4a.	5m.					1m.					
Pawtucket		1a.	3m.	2a.	4a.		5m.		8a.	9m.		7m.	6m.		
Scituate		1a.	3m.	4a.	2a.							5a.			
Woonsocket		3m.	2a.	4m.	5m.	8s.	7m.	6m.		1a.					
Providence City	7a.	1a.		2a.	3a.	6m.	5a.					8m.	4a.	9a.	
Charlestown		2a.	3a.	5a.	6m.	4a.	1a.								
Exeter		1m.	3m.	2m.	4m.										
Hopkinton		3a.	2s.	1s.	7a.	4a.	6m.	5a.				8a.			
North Kingstown		1a.		3m.	2a.							4m.	3m.		
Richmond		2a.	3a.	5m.	4a.	6m.	1a.								
Westerly	7s.	2s.	5a.	3a.	4a.	6a.	1a.								

Figure 1, in the different columns of the Table, indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity; s. signifying severe, a. average, and m. mild. Towns not on the list in the Table failed to make returns.

Summary of Reports of the most prevalent acute diseases in the several towns during

MARCH, 1881.

TOWNS.	Acute Diseases															
	Of Brain.	Of Nasal Passages.	Of Throat.	Of Bronchiæ.	Of Lungs.	Croup.	Diphtheria.	Dysentery and Diarrhœa.	Erysipelas.	Hooping Cough.	Measles.	Mumps.	Rheumatism.	Scarlatina.	Typhoid Fever.	Intermittent Fever.
Warren	....	3a,	5m.	6a.	....	8a.	7a.	....	....	....	1m.	....	4a.	2a.	....	....
Coventry	....	2a.	....	1a.	3m.	4a.	5m.	....	....	....	6a.	7m.	....	3a.	....	....
East Greenwich	....	4m.	5m.	....	2a.	....	....	....	....	....	3m.	....	2a.	1a.	5m.	....
West Greenwich	....	3m.	....	2m.	1a.	....	....	....	....	....	....	....	4m.	....	....	....
Warwick	....	....	....	2a.	1a.	4a.	3m.	....	....	1m.	2a.	....	3a.	3a.	....	....
Little Compton	5a.	2s.	....	4s,	1a.	....	....	....	....	....	....	....	3m.	....	6a.	....
Tiverton	....	1a.	3m.	2a.	....	....	....	....	....	....	....	....	4m.	....	....	....
Cumberland	....	4m.	6s.	3m.	....	3m.	....	....	....	....	2a.	....	1s.	....	....	....
East Providence	....	1a.	....	2m.	3a.	....	4m.	....	....	....	....	....	5m.	....	....	....
Johnston	....	2m.	....	3m.	1a.	5a.	....	....	6a.	....	....	....	4m.	....	....	....
Foster	....	3m.	....	2a.	1a.	....	....	6m.	....	....	....	....	4m.	5m.	7m.	....
Lincoln	....	1a.	5s.	2a.	....	3m.	....	....	....	....	4a.	....	6a.	....	....	....
Pawtucket	....	2m.	1m.	3m.	5m.	4a.	7m.	....	....	....	6m.	....	....	....	....	....
Scituate	....	1m.	3m.	2a.	4m.	6m.	....	....	....	2a.	....	....	5a.	....	....	....
Providence City	6a.	1a.	....	2m.	4a.	3m.	5a.	....	4a.	5a.	....	....	....	7a.	....	....
Charlestown	....	3a.	....	2m.	1a.	4a.	5m.	....	....	....	....	....	6m.	....	....	....
Exeter	....	2a.	4a.	1s.	3a.	6m.	5a.	....	....	....	....	....	7a.	8m.	....	....
Hopkinton	....	3a.	1s.	2a.	3a.	4m.	5a.	6m.	....	....	....	....	....	....	7a.	8a.
North Kingstown	....	4m.	5m.	....	2m.	....	....	....	....	....	3m.	....	....	1m.	....	....
Richmond	....	2m.	6a.	3m.	1a.	....	5m.	....	....	....	....	....	4a.	7m.	....	8m.
Westerly	6m.	3a.	8m.	4a.	1a.	10a.	5m.	....	....	....	....	....	2s.	9a.	12a.	11a.

Figure 1, in the different columns of the Table, indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity; s. signifying severe, a. average, and m. mild. Towns not on the list in the Table failed to make returns.

Summary of Reports of the most prevalent acute diseases in the several towns during

APRIL, 1881.

TOWNS. Acute Diseases	Of Brain.	Of Nasal Passages.	Of Throat.	Of Bronchiæ.	Of Lungs.	Croup.	Diphtheria.	Dysentery and Diarrhœa.	Erysipelas.	Hooping Cough.	Measles.	Mumps.	Rheumatism.	Scarlatina.	Typhoid Fever.	Intermittent Fever.	Small Pox and Varioloid.
Barrington	......	3a.	4a.	5m.	......	......	6m.	......	......	......	2a.	......	1m.	......	......	......	......
Warren	......	5a.	3a.	6a.	......	......	4a.	......	......	......	1a.	......	2a.	......	......	......	......
Coventry	......	4m.	5a.	......	1a.	......	2m.	......	......	......	3m.	7m.	......	6m.	5a.	......	......
East Greenwich	......	1a.	4a.	......	2a.	......	......	......	......	......	3m.	......	......	2s.	......	......	......
Warwick	......	......	5a.	......	1a.	......	2a.	......	......	2m.	3m.	......	......	......	4a.	......	......
Little Compton	3a.	2m.	......	1a.	......	......	......	......	......	......	......	......	4s.	......	......	......	......
Middletown	......	1a.	3m.	4m.	2m.	......	......	......	......	......	......	......	4m.	......	......	......	......
Portsmouth	......	1a.	2m.	3m.	......	......	......	......	......	......	......	......	4m.	......	......	......	......
Tiverton	......	......	4m.	1m.	2a.	......	......	......	......	......	......	......	3m.	......	......	......	......
Newport City	......	1a.	4m.	2m.	......	......	3s.	......	......	......	......	......	5m.	......	......	......	......
Cranston	......	1a.	3m.	2a.	4a.	5a.	7m.	......	......	......	......	......	6a.	8m.	......	......	......
Cumberland	6s.	3a.	......	2a.	4s.	......	......	......	7s.	......	5m.	......	1s.	......	......	......	8m.
East Providence	......	1a.	......	3m.	2a.	......	5m.	......	......	......	......	......	4a.	6m.	......	......	......
Johnston	......	2a.	4m.	3a.	1m.	......	5m.	......	......	......	......	......	7m.	6m.	......	......	......
Foster	......	1m.	......	2a.	3m.	......	......	......	......	......	......	......	4m.	......	5m.	......	......
Lincoln	......	......	3a.	1a.	2a.	......	......	......	8a.	......	5m.	......	4a.	......	6m.	7a.	......
North Providence	......	......	2a.	3a.	1a.	......	......	......	4m.	......	5m.	......	......	6m.	......	......	......
North Smithfield	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Pawtucket	......	1m.	3a.	4a.	2a.	5m.	7m.	......	......	......	......	......	......	6m.	......	......	......
Scituate	......	2a.	4m.	1m.	3a.	5a.	......	......	......	2a.	......	......	6a.	......	......	......	......
Providence City	9a.	1m.	4m.	2a.	5a.	......	6a.	......	......	......	3m.	......	......	7m.	8a.	......	......
Charlestown	......	1a.	......	2a.	4a.	5m.	3m.	......	......	......	......	......	6a.	7m.	......	......	......
Exeter	......	2a.	6s.	1s.	4s.	8s.	5a.	......	......	......	......	......	7m.	8m.	......	......	......
Hopkinton	......	......	2s.	1m.	3a.	4s.	6a.	8m.	......	......	......	......	5a.	......	......	7a.	......
North Kingstown	......	1a.	4m.	......	2a.	......	......	......	......	......	3m.	......	......	5m.	......	......	......
Richmond	......	4a.	2a.	1a.	3a.	5a.	6m.	......	......	......	......	......	......	......	......	......	......
Westerly	......	1a.	......	2a.	4a.	5a.	3m.	......	......	......	......	......	7a.	6a.	......	......	8m.

Figure 1, in the different columns of the Table, indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity; s. signifying severe, a. average, and m. mild. Towns not on the list in the Table failed to make returns.

Summary of Reports of the most prevalent acute diseases in the several towns during

MAY, 1881.

TOWNS. Acute Diseases	Of Brain.	Of Nasal Passages.	Of Throat.	Of Bronchiæ.	Of Lungs.	Croup.	Diphtheria.	Dysentery and Diarrhœa.	Erysipelas.	Hooping Cough.	Measles.	Rheumatism.	Scarlatina.	Typhoid Fever.
Warren			1a.	3a.				4a.				2a.		
Little Compton			1a.	3a.				4a.				2a.		
Cranston		1a.		2m.						4m.	3m.			
Cumberland			5m.	4m.	3a.	6m.					1a.	2s.		
East Providence		1a.	4m.	2a	3m.					5a.				
Johnston		1a.			2m.					5m.				
Foster			2m.	1m.		3m.						4m.		
Lincoln	6a.		2m.	3a.	1m.	8a.		7a.	9a.		4m.			5m.
North Providence		1a.									2m.			
Scituate		1a.										2m.		3m.
Providence City	6a.	1m.	2m.		5a.		3m.			7a.	8a.		4m.	
Hopkinton		1a.	2s.	4a.	3a.	6s.	8m.	9m.				5a.		
Richmond		6a.	2m.	5m.		4m.					1m.	3m.		

Figure 1, in the different columns of the Table, indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity; s. signifying severe, a. average, and m. mild.

Reports from several towns not in the above Table, state a diminished amount of general sickness, and no particular disease prevailing largely.

Summary of Reports of the most prevalent acute diseases in the several towns during

June, 1881.

TOWNS.	Acute Diseases															
	Of Brain.	Of Nasal Passages.	Of Throat.	Of Bronchiæ.	Of Lungs.	Croup.	Diphtheria.	Dysentery and Diarrhœa.	Erysipelas.	Hooping Cough.	Measles.	Rheumatism.	Scarlatina.	Typhoid Fever.	Intermittent Fever.	Cholera Morbus.
East Greenwich											1m.		2s.			
Cranston				1a.	2m.				4m.		3m.				5m.	
Cumberland			1s.	2a.	6a.			3m.				5m.				4a.
East Providence			1m.	2a.												
Johnston			2a.	1a.		5a.		4m.		7a.	6m.	3m.				
Foster					2a.		3a.				1a.	4m.				
Lincoln	9a.		4a.	2a.	5m.			3m.	10m.		1a.	6a.	8m.	7m.	11a.	
Providence City	6a.			1a.	2a.		9m.		5m.	4a.	3a.		8m.	7m.		
Hopkinton		1a.	2s.	3a.		4a.	8m.	7a.				5a.				6m.

Figure 1, in the different columns of the Table, indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity; s. signifying severe, a. average, and m. mild. Towns not on the list in the Table failed to make returns, except as stated below.

Reports from a number of towns not on the list, indicated a comparative immunity from acute sickness of importance.

Summary of Reports of the most prevalent acute diseases in the several towns during

JULY, 1881.

TOWNS.	Acute Diseases																
	Of Brain.	Of Nasal Passages.	Of Throat.	Of Bronchiæ.	Of Lungs.	Croup.	Diphtheria.	Dysentery and Diarrhœa.	Erysipelas.	Hooping Cough.	Measles.	Rheumatism.	Scarlatina.	Typhoid Fever.	Cholera Infantum.	Cholera Morbus.	Intermittent Fever.
Barrington								1m.			4a.			6m.	2a.	3m.	5a.
Warren							2s.	1m.			7a.	8a.		5a.	3m.	4m.	6a.
Coventry								1a.						4m.	2a.	3m.	
East Greenwich								1m.						3m.	2a.	4m.	
West Greenwich			1m.					2m.							3m.	4m.	
Warwick						5m.	3m.	2a.			2a.		4m.		1a.	3m.	
Portsmouth								1m.								2m.	
Tiverton	3m.							1m.				4a.			2m.	5m.	6a.
Cranston							6m.	1a.			5m.			4m.	2a.	3m.	
Cumberland		6a.	3a.	5a.				2a.				4a.				1a.	
East Providence							4m.	1a.			5m.				2a.	3m.	
Johnston							7m.	1a.		6m.	5m.			4a.	2a.	3m.	
Foster					5m.			1m.			2m.	4m.	3m.		2a.		
Lincoln			4m.	8a.	6m.			1a.	10m.		2a.	5m.		7a.		3m.	9a.
North Providence			3m.					1a.			4a.				2a.		
North Smithfield		5a.						1a.							2m.	3m.	
Pawtucket			3m.				7m.	1a.			6m.			5m.	2a.	4m.	
Scituate			4m.					2a.		5m.				3m.	1m.		
Woonsocket		5m.		4m.				1m.			6a.			8m.	2m.	3m.	7m.
Providence City	7a.						6m.	2a.		5a.	3m.		9m.	8m.	1a.	4m.	10m.
Charlestown					7m.		4m.	1a.				6m.		3m.	2m.	5a.	
Exeter				4m.				1a.							2a.	3a.	
Hopkinton		8m.	6s.				7m.	2a.						3a.	4s.	1a.	5m.
North Kingstown								1a.						3m.	2a.	4m.	
Richmond				4m.				1a.				5m.			3a.	2a.	
Westerly					7a.		4a.	3a.				6a.	8m.	5a.	2a.	1s.	

Figure 1, in the different columns of the Table, indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity; s. signifying severe, a. average, and m. mild. Towns not on the list in the Table failed to make returns.

Summary of Reports of the most prevalent acute diseases in the several towns during

AUGUST, 1881.

TOWNS.	Acute Diseases					Diphtheria.	Dysentery and Diarrhœa.	Erysipelas.	Hooping Cough.	Measles.	Rheumatism.	Scarlatina.	Typhoid Fever.	Intermittent Fever.	Cholera Infantum.	Cholera Morbus.
	Of Brain.	Of Nasal Passages.	Of Throat.	Of Bronchiæ.	Of Lungs.											
Barrington							2m.		5m.				4m.	1a.	3m.	
Warren			1m.			5a.	8a.		2a.			9a.	4a.	3a.	6a.	7a.
Coventry							4a.			3m.		5m.			1a.	2a.
Warwick	6a.			5m.			3a.			3a.		4m.			1a.	2s.
Little Compton		1m.		2m.			3m.								4m.	
Portsmouth				3m.			1a.				2m.					4m.
Tiverton							1a.				3m.		4a.		2m.	
Cranston			3m.	4m.		5m.	1m.								2a.	
Cumberland		4m.	5s.				3a.				7m.			6a.	2a.	1s.
East Providence	7a.					5m.	1a.		4m.				6m.	8m.	2a.	3m.
Johnston			3m.	4m.		6m.	1a.								2a.	5a.
Foster	4a.					6m.	1a.			5m.				7m.	2a.	3m.
Glocester			2m.	3s.	6s.		1a.						4m.	5m.		3a.
Lincoln			5m.	4m.	8m.		1a.			6a.	7m.			9m.	3a,	2a.
North Providence			4m.	5m.	7a.		2m.								3a.	6m.
North Smithfield		3m.		4a.	5m.		1m.								2m.	
Pawtucket			4m.	5a.	8a.		1a.			7a.	6m.			9m.	2a.	3m.
Scituate		4m.		3m.			1m.	5m.	6m.						2a.	
Smithfield							1m.				4m.				2m.	3m.
Woonsocket		3a.	5m.	4m.	8m.		1m.							9m.	2m.	7a.
Providence City	5a.		7m.	6m.	9a.	4m.	2a.		3a.				8m.	9a.	1a.	
Charlestown						6a.	3m.					5m.	4a.		1a.	2m.
Exeter		2m.	5m.		6a.		1a.						3m.		4m.	7a.
Hopkinton		5m.	3s.			6m.	2a.				8a.		7m.	9a.	4s.	1s.
Richmond			5m.		6m.		1a.						3m.	8m.	4s.	2s.
Westerly						6a.	3a.					5a.	4a.	7a.	1a.	2s.

Figure 1, in the different columns of the Table, indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity; s. signifying severe, a. average, and m. mild. Towns not on the list in the Table failed to make returns.

Summary of Reports of the most prevalent acute diseases in the several towns during

SEPTEMBER, 1881.

TOWNS.	Acute Diseases					Croup.	Diphtheria.	Dysentery and Diarrhœa.	Hooping Cough.	Measles.	Rheumatism.	Scarlatina.	Typhoid Fever.	Intermittent Fever.	Cholera Infantum.	Cholera Morbus.
	Of Brain.	Of Nasal Passages.	Of Throat.	Of Bronchiæ.	Of Lungs.											
Barrington			4a.					2m.					3m.	1m.		
Warren			1m.				8m.	7a.			5m.		4m.	2m.	3m.	6m.
Coventry		4m.	5a.	3m.			6m.	1m.				7m.			2a.	
East Greenwich								1				5m.	3a.		2a.	4m.
Warwick		3m.		4m.			5m.	1a.				5m.		6m.	2a.	
Little Compton		2m.	1m.	3m.				4m.								
Portsmouth			2m.					1m.			3m.				4m.	
Tiverton								2a.			3a.				1a.	
Cranston			3m.				4m.	1m.				6m.	5m.		2m.	
Cumberland		5a.	6m.	3m.				2a.						1a.		4m.
East Providence			4m.				6m.	1m.	5m.		3m.			6m.	2m.	
Johnston			3m.				5m.	1m.	4a.	6m.					2m.	
Foster		3m.	2a.			6m.	4m.	1a.				7m.	8a.	9a.	5m.	
Glocester	4s.		3a.	2m.				1a.			5a.			3m.		2a.
Lincoln			7a.	3a.				1m.		6m.	2m.			5a.		4m.
North Providence			1a.					2m.			4m.				3m.	
North Smithfield			3a.	4m.				1m.					5m.		2m.	
Pawtucket	9a.		4a.					1m.	5m.	6			7a.	8m.	2m.	3m.
Scituate			2m.	3m.		4m.		1m.							5m.	
Woonsocket	8a.					7a.		1m.	6m.		5m.		4m.		2m.	3m.
Providence City	7a.			8a.			4m.	1m.	3a.	6m.			9m.	5m.	2a.	
Charlestown			1a.				4m.	3m.			5m.	6a.	2m.			
Exeter		1m.	5a.	2a.		3m.					6a.		4a.			
Hopkinton		6m.	7a.	4m.		8s.	1a.	4s.					2a.	9a.	8a.	3a.
North Kingstown								1m				4m.	3a.		2m.	
Richmond		1m.	5m.	2m.				6a.			10m.	9m.	4m.	8m.	7s.	3s.
Westerly		7a.		9a.	6a.		5m.				2s.	4s.	3m.	1m.	8a.	

Figure 1. in the different columns of the Table, indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity; s. signifying severe, a. average, and m. mild. Towns not on the list in the Table failed to make returns.

Summary of Reports of the most prevalent acute diseases in the several towns during

OCTOBER, 1881.

NAMES. Acute Diseases	Of Brain.	Of Nasal Passages.	Of Throat.	Of Bronchiæ.	Of Lungs.	Croup.	Diphtheria.	Dysentery and Diarrhœa.	Erysipelas.	Hooping Cough.	Measles.	Mumps.	Rheumatism.	Scarlatina.	Typhoid Fever.	Intermittent Fever.	Cholera Infantum.	Cholera Morbus.
Barrington		4m.		2m.									5m.		3a.	1a.		
Warren		7a.		6a.		4a.	4a.	5m.				5m.	3a.		2s.	1a.		
Coventry		4a.	2s.	1a.			3m.	5m.							6m.			
East Greenwich								2m.							1m.	5m.	4s.	3m.
Warwick		3m.			2a.		1m.	4m.					5a.			6m.		
Little Compton		1m.		1m.				2m.										
Portsmouth		1m.		2m.									2m.					
Tiverton		1m.	3m.	2m.									4m.		5m.			
Cranston		3m.	1a.	2a.			4m.									5m.		
Cumberland		2a.	4a.	3a.		7s.		6m.							5m.	1a.		
East Providence		1m.	3m.	2m.	4m.		7m.						5a.			6m.		
Johnston		1m.	4m.	3a.	4a.		6m.			5m.					2m.	7m.		
Foster					6a.			3a.			2m.		7m.		1a.		4m.	5a.
Glocester			3m.	4m.			5s.	3s.			2a.				1a.	4m.		
Lincoln	7a.		6a.	5a.	3a.			2a.	9m.				4a.			1a.		
North Smithfield		2m.		1a.				3m.					4m.		5m.			
Pawtucket		6a.	7a.	5a.			8a.	1m.							4m.		2a.	3m.
Scituate			4m.		3m.	2m.				1m.					5s.			
Woonsocket		2a.		1a.				3m.		4m.					5m.			
Providence City	7a.	1m.	4a.	2a.	3a.		5m.			6m.	10m.					8m.	9m.	
Charlestown		1m.					6m.	5m.						7m.	2m.	3m.	4m.	
Hopkinton		5a.	3s.	6m.		7s.	1s.	4a.					8m.	10m.	2a.			9a.
North Kingstown				3m.				2m.							1m.		4m.	
Richmond		1m.		6m.		7m.	5m.	3m.					4m.		2a.			
Westerly							5a.	4a.					3s.	8m.	2a.	1m.	7a.	6m.

Figure 1, in the different columns of the Table, indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity; s. signifying severe, a. average, and m. mild. Towns not on the list in the Table failed to make returns.

Summary of Reports of the most prevalent acute diseases in the several towns during

NOVEMBER, 1881.

TOWNS.	Acute Diseases	Of Nasal Passages.	Of Throat.	Of Bronchiæ.	Of Lungs.	Croup.	Diphtheria.	Dysentery and Diarrhœa.	Erysipelas.	Hooping Cough	Measles.	Rheumatism.	Scarlatina.	Typhoid Fever.	Intermittent Fever.	Cholera Infantum.	Cholera Morbus.
Barrington		4m.	6a.	5a.	......	......	7m.	1m.	......	......	......	......	......	2m.	3a.	......	......
Warren		5a.	8a.	4a.	......	6m.	7a.	......	......	......	......	2a.	......	1s.	3a.	......	......
Coventry		1m.	2m.	3a.	4m.	......	4m.	......	......	......	......	5m.	......	2m.	......	......	......
East Greenwich		2a.	......	5m.	......	......	......	......	......	......	......	3a.	......	1m.	......	......	4m.
Warwick		1a.	3m.	2m.	5a.	6m.	4m.	......	......	......	7a.	......	......	4a.	......	......	......
Little Compton		1m.	2m.	3m.	......	4a.	5m.	......	......	......	......	......	......	5m.	......	......	......
Portsmouth		1m.	3a.	2a.	......	......	......	......	......	......	......	......	......	4m.	......	......	......
Tiverton		1m.	2a.	......	......	......	5m.	......	......	......	......	4m.	......	3m.	......	......	......
Cranston		1a.	2a.	......	......	3m.	......	......	......	......	......	......	......	4m.	5m.	......	......
Cumberland		3a.	5a.	2m.	......	......	......	7s.	......	......	......	6m.	......	1a.	4a.	......	......
East Providence		3m.	2a.	1a.	......	......	5m.	......	......	......	......	7m.	6m.	4m.	......	......	......
Johnston		1m.	2a.	3a.	......	5a.	4m.	......	......	......	......	......	......	6m.	7m.	......	......
Foster		......	2m.	3m.	......	......	4m.	......	......	......	......	5a.	8m.	1m.	7m.	6m.	......
Glocester		2a.	3m.	4m.	......	1a.	5s.	3a.	......	......	4a.	4m.	......	3m.	......	......	......
Lincoln		......	1a.	2a.	5m.	......	......	6a.	......	......	......	7m.	......	3a.	4a.	......	......
North Providence		1m.	3a.	2a.	......	4a.	5m.	......	......	......	......	......	......	......	......	......	......
North Smithfield		1a.	2a.	3a.	......	4m	......	5m.	......	......	......	......	......	6m.	......	......	......
Pawtucket		1m.	2m.	3m	......	5a.	4m.	......	......	8m.	......	7m.	......	6a.	......	......	......
Scituate		2m.	1m.	3a.	4a.	5a.	7m.	......	......	......	......	3m.	......	6m.	......	......	......
Woonsocket		1a.	3a.	2a.	7a.	6m.	......	5a.	......	4a.	7m.	......	......	5m.	......	......	......
Providence City		1a.	3m.	2a.	4a.	6a.	5m.	......	7a.	9m.	10m.	8a.	......	......	......	......	......
Charlestown		2m.	3a.	4a.	......	......	3a.	......	......	......	......	......	1a.	5m.	6m.	......	......
Exeter		1m.	3m.	2m.	......	4a.	......	......	......	......	......	......	......	5m.	......	......	......
Hopkinton		5m.	3s.	4a.	......	6a.	1s.	7a.	......	......	......	8a.	9m.	2m.	......	......	......
North Kingstown		2a.	......	5m.	......	4m.	......	......	......	......	......	3m.	......	1m.	......	......	......
Richmond		4m.	3s.	5a.	......	......	1a.	......	......	......	......	......	2m.	4m.	......	......	......
Westerly		5a.	9a.	8a.	7a.	11a.	2m.	10a.	......	......	......	6m.	1a.	4a.	3a.	12m.	......

Figure 1, in the different columns of the Table, indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity; s. signifying severe, a. average, and m. mild. Towns not on the list in the Table failed to make returns.

Summary of Reports of the most prevalent acute diseases in the several towns during

DECEMBER, 1881.

TOWNS.	Acute Diseases					Croup.	Diphtheria.	Dysentery and Diarrhœa.	Hooping Cough.	Measles.	Rheumatism.	Scarlatina.	Typhoid Fever.	Intermittent Fever.	Cholera Morbus.
	Of Brain.	Of Nasal Passages.	Of Throat.	Of Bronchiæ.	Of Lungs.										
Barrington	....	2a.	....	3a.	4m.	....	....	....	....	....	1m.	....	5m.	....	....
Warren	....	2a.	....	1a.	5a.	6a.	....	....	....	....	3a.	....	4a.	....	....
Coventry	....	1m.	2m.	3a	....	4m.	5m.	....	....	6m.	....	....	7m.	....	....
East Greenwich	....	2a.	....	....	4a.	3m.	....	....	....	....	5m.	....	1m.	....	....
Warwick	....	1m.	4m.	2a.	....	....	4m.	....	....	3a.	....	....	5m.	....	....
Little Compton	....	1m.	2m.	3m.	....	....	6m.	....	....	....	4m.	....	5m.	....	....
Portsmouth	....	1m.	4a.	2m.	....	3m.	6m.	....	....	....	....	....	5m.	....	....
Tiverton	....	1m.	5a.	2m.	3m.	....	4m.	....	....	....	....	....	6a.	....	....
Cranston	....	1m.	3a.	2a.	....	....	4m.	....	7m.	....	6a.	....	5m.	....	....
Cumberland	....	2a.	6m.	1m.	....	4m.	....	4s.	....	....	7m.	....	5a.	....	3a.
East Providence	....	1m.	2a.	3a.	....	....	5m.	....	....	....	....	....	4m.	....	....
Johnston	....	1a.	5a.	3a.	....	....	7m.	....	6a.	....	4m.	....	2m.	....	....
Foster	....	1m.	3m.	2m.	4m.	....	....	....	....	....	....	....	5m.	....	....
Glocester	....	....	4m.	5s.	....	4m.	....	2a.	....	1a.	3s.	....	....	....	....
Lincoln	....	1m.	7a.	2a.	6a.	....	....	3m.	....	....	5a.	....	4a.	7m.	....
North Providence	....	1a.	5a.	2a.	....	....	6	....	4m.	....	....	....	3m.	....	....
North Smithfield	....	1a.	....	2a.	....	5a.	....	....	6m.	....	4m.	....	3m.	....	....
Pawtucket	....	1a.	....	2m.	6a.	....	....	3a.	....	....	4m.	....	5m.	....	....
Scituate	....	2m.	3a.	1m.	....	4a.	6m.	....	....	....	3m.	....	5m.	....	....
Woonsocket	....	1m.	5m.	2a.	....	....	....	....	4a.	6m.	3m.	....	....	....	....
Providence City	7a.	2a.	3a.	1a.	6m.	9s.	5m.	....	4a.	....	....	....	8m.	....	....
Charlestown	....	1m.	....	7a.	....	4a.	2m.	....	....	....	6m.	3m.	5m.	8m.	....
Exeter	....	2a.	1a.	....	5m.	3m.	6m.	....	....	....	7m.	....	8m.	....	....
Hopkinton	....	3a.	1s.	....	8a.	5m.	2s.	....	....	....	7m.	6m.	4m.	....	....
North Kingstown	....	2a.	....	5a.	3m.	4a.	....	....	....	....	....	....	1m.	....	....
Richmond	....	3a.	1a.	2a.	7m.	5a.	4a.	....	....	....	....	....	6m.	....	....
Westerly	....	....	....	7a.	....	5a.	2m.	....	....	....	4m.	1m.	3a.	6m.	....

Figure 1, in the different columns of the Table, indicates the disease affecting the largest number of persons. Fig. 2, the next largest number, and so on. The letters following the figures denote the degree of severity; s. signifying severe, a. average, and m. mild. Towns not on the list in the Table failed to make returns.

ANNUAL REPORTS OF MEDICAL CORRESPONDENTS.

For the purpose of continuing a plan which had previously seemed to be of advantage, there was sent at the end of the year a circular to each of the medical correspondents and a number of other physicians, for a more comprehensive general report in relation to disease, presumable causes of disease, and the sanitary condition of localities during the preceding year in their respective circuits.

The following was the form of circular sent:

CIRCULAR H.

OFFICE OF SECRETARY OF THE STATE BOARD OF HEALTH

PROVIDENCE, Jan. 1, 1882.

To Physicians:

A year since it seemed desirable in addition, and supplementary to, the *Monthly* returns of regular correspondents, to obtain from all respectable physicians in every section of the State an Annual Report covering the whole twelve months preceding.

The following questions will indicate the information sought, and the general plan of such report; but correspondents need not be confined to precise replies to the questions presented, all the freedom being allowable of such modifications and additions, as the circumstances or peculiarities of each locality may seem to warrant.

These annual reports are desired for the purpose of presenting the status of the public health and the sanitary conditions existing in the different sections of the State, during the year 1881, in the Fourth Annual Report of the State Board of Health.

They should be returned to the Secretary of the Board by the second week in February.

Any additional postage stamps needed to cover postage on more extended consideration of the topics suggested, or any other topic having relation to the public health, will be immediately refunded on the receipt of papers,

QUESTIONS.

1. Name of city or town, and circuit.

2. What has been the general amount of sickness, of all kinds, in your circuit in 1881, as compared with ordinary years? If greater or less, how much? Estimated.

3. What epidemics have prevailed in your circuit during the year 1881? If any, give the names in the order of their occurrence, in regard to date; the length of time they were prevalent; the degree of severity, and the localities where they prevailed.

4. What endemic diseases, if any, have been prevalent in your circuit during the year 1881? Please describe the peculiarities, if any, and the localities where they occurred.

5. What, in your opinion, is the probable cause, or causes of the endemics described?

6. What diseases of common occurrence, not strictly endemic nor contagious, have had an unusually large prevalence in your circuit during the year?

7. What contagious or infectious diseases have prevailed in your circuit, without becoming epidemic?

8. What diseases have been attended with an unusual fatality?

9. What circumstances have occurred within your observation or knowledge, that seemed to indicate that scarlet fever, diphtheria or typhoid fever had been taken, or communicated from one person to another? A full history of known facts in detail should be given. Such history need not be confined to any particular year. State on separate sheet.

10. What localities in your circuit do you consider peculiarly unhealthy? giving names and geographical position, and the diseases most prevalent, whether endemic or otherwise, and what you consider the causes of the peculiar unhealthiness.

11. Have any changes been made, during the year 1881, in your locality, or any other locality having village characteristics, in your circuit, in relation to better drainage, more complete removal of excretæ, house refuse, garbage, &c.,

and have there been any other new measures, public or private adopted, to promote better sanitary conditions? State what, if any.

12. What influence, in your opinion, had the prolonged drouth of the last half of the year 1881, in the production or promotion of diseases? And, if any, in what manner, and of what diseases?

13. Has there been, in your opinion, any advance in the public sentiment of your circuit, in regard to the importance of sanitary surroundings; or any increased interest in questions appertaining to means of preventing diseases, and promoting individual and general health? State what reasons for belief.

14. Are there any localities in your circuit which, without being considered generally unhealthy, are in your opinion promotive of pulmonary consumption, gravel, calculus, malarial or any other diseases? If any, state locality and form of disease.

Physicians receiving this circular, it is believed, will have the courtesy to fill the blank spaces between the questions in response to the same, and thus confer a favor on the State Board of Health, and show an interest in public sanitation by contributing from their knowledge, experience and observation, such statements of facts as have a practical bearing on the questions that underlie all investigation, into the causes and means of prevention of disease.

CHAS. H. FISHER, *Secretary.*

REPLIES TO CIRCULAR II.

The following reports, received from local correspondents of the medical profession in the several cities, towns and villages of the State, will give a good representation of the general status of the public health during the year 1881, as to the presence or absence of epidemics or endemics in the several locations, the sanitary conditions and improvements, if any, in their several circuits, and other suggestions in response to the preceding circular:

BRISTOL COUNTY.

1. Warren and part of Barrington.

2. The general amount of sickness of all kinds, within the limits of this town in 1881, so far as I have knowledge, as compared with ordinary years, has been about one-third less.

3. Malarial fevers prevailed in Barrington largely in September and October. No epidemics, to my knowledge, existed to any large extent.

4. None, unless the malarial fevers be so called that prevailed somewhat extensively in some parts of Barrington in September and October.

6. No diseases of common occurrence, of importance, not strictly endemic nor contagious, have had an unusually large prevalence in this town during the year.

8. No diseases have been attended with an unusual fatality.

11. No changes have been made, during the year 1881, in this town, in relation to better drainage, or more complete removal of excretæ, &c., and few, if any, new measures adopted, to promote better sanitary conditions.

14. I know of no localities in this town which are particularly promotive of pulmonary consumption, gravel, calculus, malarial or any other diseases.

Otis Bullock.

1. Warren ; Barrington and Bristol, in part.

2. The amount of sickness, of all kinds, in this circuit in 1881, as compared with ordinary years, has been a general average.

3. The epidemic diseases that have prevailed in this circuit during the year 1881, although not occurring as extensive epidemics, are as follows: Scarlet Fever, in February and March, severe, restricted to few families; Typhoid Fever, in September and November, average, scattering; Parotiditis, in July and August, average, in various localities; Hooping Cough, November and December, average, in various localities; Diphtheria, September, October and November, severe, but restricted to few families.

4. There were no endemic diseases of a marked character in my practice, excepting Intermittent Fever.

5. Intermittent Fevers prevalent so generally in Barrington, can be ascribed to the low forms of vegetation accruing in shallow water, and exposed by droughts to the air.

6. Diseases of common occurrence, not strictly endemic nor contagious, that have had an unusually large prevalence in my circuit during the year are, Tonsillitis and various forms of Pharyngitis.

8. Scarlet Fever has been attended with an unusual fatality, but kept restricted to few families. In one family four deaths, in another three.

9. A case of Scarlet Fever occurred in a family in the eastern part of Warren. A member of the family working in the mill here, tended a loom or mule in close vicinity to a Mr. H., and in two weeks members of the family of the latter, though living in Barrington, and remote two miles, (no other cases within a mile or so) were attacked, with three deaths in the latter, four deaths in former.

10. Attention has been paid to the most unhealthful parts of Warren, and the result is that diseases appearing here are scattered, and have no definite locality.

11. The Warren Manufacturing Company have given considerable attention to the care of districts owned by them, by removing excretæ, refuse, &c., and repairing passages and lanes. The Cutler Manufacturing Company also have improved grounds very much.

12. Could not perceive any particular influence occasioned by the drought, unless the Intermittent and Remittent fevers were an example.

13. The proposed introduction of water from the Kickimuit river will, in all probability, be a decided sanitary benefit to the town, as well water is modified by the brackish influence of the neighboring sea water.

14. There are no localities in my circuit, which, without being considered generally unhealthy, are promotive of pulmonary consumption, gravel, calculus, malarial or any other diseases.

G. L. Church.

1. Bristol.

2. The general amount of sickness, of all kinds, in my circuit in 1881, has been about the same as in previous years.

3. No epidemics have prevailed in this locality during the year 1881.

4. No strictly endemic diseases have been prevalent in this town during the year. Some cases of Typhoid Fever. No peculiarities about the cases, and they occurred in different localities in town.

5. Probably owing to impure water which contained organic matter.

6. Catarrh has had an unusually large prevalence in this section during the year.

7. The only contagious or infectious disease that has prevailed in this circuit, without becoming epidemic, was Typhoid Fever.

10. I do not know of any one locality more unhealthy than another.

11. There have been no changes made during the year 1881, in this locality, in relation to better drainage, or more complete removal of excretæ, house refuse, garbage, &c.

12. The drouth had no influence in the production of disease in this town, on the contrary, we had a remarkable healthy season.

13. There has been no advance in the public sentiment in regard to the importance of sanitary surroundings as a means of preventing disease.

14. I do not know of any localities in this section which, without being considered generally unhealthy, are promotive of pulmonary consumption, gravel, calculus, malarial or any other disease.

T. H. Shipman.

KENT COUNTY.

1. East Greenwich and adjoining towns.

2. The general amount of sickness, of all kinds, in my circuit in 1881, as compared with ordinary years, was rather under the average.

3. Early in the year, April and May, we had Measles and German Measles, but mild; some local epidemics of Scarlet Fever confined to families, in June and July; nothing more than this.

4. We have had no especial endemics, with perhaps the exception of the cases of Intermittent Fever, to be mentioned elsewhere.

6. In the spring and fall an unusual prevalence of Catarrhal Influenza.

7. The contagious or infectious diseases that have prevailed in my circuit, without becoming epidemic, were Scarlet Fever, to a limited degree, and Measles and Rotheln.

8. No diseases have been attended with an unusual fatality.

9. The cases of Scarlet Fever which occurred in June, — six in one family, two fatal, — were apparently introduced by a child, convalescent of the disease, or supposed to be well over it, and this has been the most frequent way of its introduction in my experience.

10. We have no localities in this vicinity especially unhealthy.

11. No changes have been made during the year 1881, in this locality, in relation to better drainage, or more complete removal of excretæ, house refuse, &c.

12. The prolonged drouth of the last half of the year 1881 had no noticeable influence in the production or promotion of disease.

13. No particular change in public sentiment with the people generally. The attempt at improvement in the condition of affairs of this kind in the newer and better class of farm houses, has, I think, often led to serious mischief, like the covering over the old fashioned open sink-drain and receptacle, near the back door, and substituting an underground pipe and covered cess-pool, with an opening for an overflow, but without any trap. The accumulated gases are, in certain directions of the wind, pressed back into the house with great force, contaminating the air of the kitchen and every room leading from it, sometimes making itself perceptible in the uppermost sleeping rooms. In the old way there was nothing of this.

14. The western slope of the ridge extending from Greenwich north to Apponaug, has a very different soil and drainage from the eastern, and the atmospheric influences would, I think, have a marked effect upon one of consumptive tendencies, but no data have yet been collected.

J. H. ELDRIDGE.

1. East Greenwich and vicinity.

2. The general amount of sickness, of all kinds during 1881, was less; probably not more than three-quarters the usual amount.

3. No epidemics have prevailed in this circuit during the year 1881.

4. The only endemic disease of importance prevalent in this town during the year 1881, was Fever and Ague, near our print works, on a side hill near the brook and near a marshy piece of land.

5. The probable cause of the endemic was the emanations from the marshy land.

6. No unusually large prevalence of any particular disease.

7. The contagious or infectious diseases which prevailed in this circuit, without becoming epidemic, were Typhoid Fever, Scarlet Fever, Diphtheria, Pertussis, Parotiditis, and Rubeola.

8. No diseases have been attended with an unusual fatality.

9. In a family of five children one was taken with Scarlet Fever, in about a

week the other four came down with it within three days of each other, showing that they contracted it of the first. Other similar cases have occurred. Have not seen a single case of Typhoid Fever that was contracted from another person during the year 1881. Have seen diphtheria contracted by different members of same family.

10. The lower streets of this village are more unhealthy than the upper streets. Diptheria and Scarlet Fever prevail more on the lower streets, and the disease is more virulent. Typhoid Fever rarely occurs in this village, and when it does is on the lower streets. Typhoid Fever prevails more in the country with farmers that throw out slops round the house, and where they have the well on lower ground than the out buildings.

11. No changes have been made during the year, in this locality, in relation to better drainage, and no public measures adopted to promote better sanitary conditions.

12. No particular influence was occasioned by the prolonged drouth of the last half of the year, in the production or promotion of diseases. The latter part of the season was, generally, the most healthful, but in a few instances Typhoid Fever was traced to a well that was low, and in one instance a form of Typho-Malarial Fever was apparently caused by some stagnant ponds getting dry that had not been dry for years. The ponds were not far from the house.

13. I have not observed any advance in public sentiment in regard to the importance of sanitary surroundings; or any increased interest in means of preventing diseases.

14. In the direction of Warwick, if any.

E. G. CARPENTER.

1. Warwick; Centreville to Phenix and surrounding villages.

2. The general amount of sickness, of all kinds, in 1881, as compared with ordinary years, was less; about ten per cent.

3. Scarlet Fever, Diphtheria, Varicella, Pertussis, Harrisville and Phenix in the spring, mild type; Diphtheria, throughout the year; Varicella, autumn; Pertussis, winter; quite severe all through the villages. Very few cases of Typhoid Fever, less than known for years.

4. No endemic diseases have been prevalent during the year.

6. Rheumatism has had an unusually large prevalence during the year.

8. No diseases have been attended with an unusual fatality.

9. Scarlet fever and Measles communicated through the schools and families. Nearly every case of Diphtheria could be traced to defective drainage or other bad sanitary surroundings.

10. Localities along the river bank on low ground. Diphtheria, Rheumatism. The former through defective drainage, and the latter from moisture and evaporation.

11. As a general thing people have paid more attention to their sanitary surroundings, and have frequently called attention to the condition of their neighbors' premises where nuisances existed, or were supposed to exist. No new measures adopted by the town.

12. In my opinion the prolonged drouth of the last half of the year had no influence in the production or promotion of diseases.

13. Some advance in public sentiment in regard to the importance of sanitary surroundings, and interest in means of preventing diseases, has been shown by constant enquiries and personal attention to premises.

ALBERT G. SPRAGUE.

1. Coventry; Pawtuxet valley villages.

2. The general amount of sickness of all kinds in 1881, as compared with ordinary years, was somewhat less.

3. No epidemics have prevailed during the year. In the early part of 1881 there were some cases of Scarlet Fever, Measles, Mumps, and Chicken Pox, all of a mild character.

4. No endemic diseases have been prevalent during the year.

6. No diseases have had an unusually large prevalence during the year.

7. The contagious or infectious diseases that have prevailed without becoming epidemic, are Pertussis, Scarlet Fever, Measles, Mumps, and Chicken Pox, of a mild form and moderate number.

8. No diseases have been attended with an unusual fatality.

10. I regard the circuit in which I practice ordinarily healthy; will compare favorably with the healthiest localities in Rhode Island.

11. I know of but one, and that an improvement in the highway between Quidnick and Anthony, affording better drainage.

12. The prolonged drought of the last half of the year 1881 had no influence in the production or promotion of diseases. It was the healthiest six months I ever knew here.

13. I have seen no evidence of any advance in public sentiment in regard to the importance of sanitary surroundings.

14. There are no localities in my circuit which, without being considered generally unhealthy, are promotive of pulmonary consumption, gravel, calculus, malarial or any other diseases.

JOHN WINSOR.

1. Pontiac, Warwick, and part of Cranston.

2. The general amount of sickness, of all kinds, in this circuit in 1881, has been about the same as in past years.

3. Measles prevailed in and about Pontiac and Hill's Grove. Of a severe type, one fatal case.

4. Malarial Fevers. There was one case of Putrid Scarlet Fever, and fatal, no other cases occurred in the locality; this was in Pontiac.

7. No contagious or infectious diseases have prevailed in this circuit, without becoming epidemic, except Scarlet Fever.

8. No diseases have been attended with an unusual fatality.

9. In the above named case of Scarlet Fever, the child who died played with

some toys given her by a child two years previous, said child having just had Scarlet Fever. The toys were laid away in an old trunk most of the time during the two years. This is the cause I gave for the contagion.

10. I know of no locality in my circuit peculiarly unhealthy.

11. Since the year 1879 the village of Pontiac has been kept very much cleaner, refuse matter, &c., being removed nearly every day, so now we seldom have Typhoid Fever. Formerly had a great deal.

12. The prolonged drouth seemed to me to promote bowel complaints.

13. As to any advance in public sentiment, in regard to the importance of sanitary surroundings, I know of none in particular, unless the fact of keeping the streets very much cleaner may be so construed.

14. I think Pontiac, on account of being made land to a great extent, is promotive of both Malaria and pulmonary diseases, the latter because it is so very damp, and a number of cases coming to my knowledge having originated in Pontiac.

DAN. O. KING.

NEWPORT COUNTY.

1. Newport.

2. The general amount of sickness of all kinds in this circuit, in 1881, has not been above the average of previous years, and has been certainly less than during the year 1880.

3. A slight epidemic of Diphtheria existed in the spring of a very fatal form. The greater per centage of those affected died. The disease was chiefly confined to a limited locality, and in each case the sanitary surroundings were bad. In one family there were three fatal cases, the disease being contracted by visiting a family in which there were two cases, also fatal, and being allowed to see the remains of one of the children who died of the disease. The only other epidemic has been Scarlet Fever, which has existed in a mild form during the last few months of the year. Very many of the cases were strictly traceable to other cases.

4. Zymotic and endemic diseases have not prevailed to any great extent during the past year. During the summer months Diarrhœa in a very mild form prevailed to a greater degree than during the previous four or five years. There was also a slight amount of Dysentery and Typhoid Fever.

6. No diseases of common occurrence, not strictly endemic or contagious, have had an unusually large prevalence in this circuit during 1881.

7. Two cases of Small Pox occurred during December, 1881. One case, a woman, contracted the disease at Fall River; recovered. The other, a seaman, contracted the disease in Philadelphia, which did not manifest itself till his vessel arrived at Newport. This case proved fatal.

8. No disease has been attended with unusual fatality.

9. Number 9 is answered in reply to number 3.

10. The old portions of the city and harbor front are the localities which may be considered most unhealthy, on account of bad sanitary surroundings, badly

constructed cesspools, and impure well water. The immediate harbor front is rendered unhealthy from the fact that most of the city sewers empty into the harbor among the wharves, the formation of the inner harbor being such that the sewerage matter is not fully carried out by the tide.

11. During 1881 no radical improvement has taken place in the drainage of the city, although an unusual number of sewers have been constructed. These sewers have all been laid without any reference to a general plan. During the latter part of the year there was a decided improvement in the method of removing the excretæ, house refuse and garbage.

12. The prolonged drouth of the summer of 1881 caused an increase in the number of bowel complaints.

13. There has been a steady advance in the public sentiment, in regard to the importance of sanitary surroundings. A large portion of the community are earnestly urging the formation of a Board of Health, and are seeking to improve the sanitary condition of the city. In the spring of 1881, a lengthy petition, signed by many property holders, was sent to the city council, praying for a Board of Health. This desire has been met by decided opposition from the city authorities. The National Board of Health is having made under its supervision an inspection of all summer resorts, and in the summer of 1881 sent Mr. Ernest W. Bowditch to inspect the sanitary condition of our city. Mr. Bowditch's report has not yet been published, and I am therefore unable to give the results of his investigations. By his analysis of the water of seventy wells scattered throughout the thickly settled portions of the city, he found a vast majority unfit for use. During the past year, the very important question of the possibility of the germs of disease being carried by ice has been under investigation by Prof. Raphael Pumpelly. This investigation was made at the request of the Sanitary Protective Association of this city, in order to determine the purity of the ice taken from a pond into which drained the overflow from the cesspools of several premises. His analysis showed that the germs of disease contained in water were not destroyed by the process of freezing, and that the ice also contained a greater amount of impurity than the water from which it was formed. The ice examined was taken from the centres of blocks. Prof. Pumpelly says: "I am inclined to think that there is more danger of ice carrying contamination than the water from which it is frozen, for the following reasons· In the warm weather sewage and other organic matters coming into a pond is much more rapidly oxidized and dissipated than in winter, when the process is very much retarded by the low temperature. For this reason ice formed on such a pond should contain, it would seem, a considerable larger amount of contamination than the water would have in the summer." A practical result of this investigation has been that an impure ice supply for our city, has had its sanitary defects remedied, so that in the future this ice supply will be good. The Sanitary Protective Association of this city, an account of which organization appeared in the last annual report of the State Board of Health, is continuing to gain strength and influence. It now numbers over 80 members, and is doing practical work in improving the sanitary condition of the homes of its individual members, and showing the community the importance of a radical change in the supervision of the sanitary condition of the city.

14. There are no localities in this circuit, which, without being considered generally unhealthy, are in my opinion productive of pulmonary consumption, gravel, calculus or malaria,

FRANCIS H. RANKIN.

1. Little Compton.

2. The general amount of sickness of all kinds, in 1881, as compared with ordinary years, was about one-third less.

3. No epidemics have prevailed in my circuit during the year.

4. No endemic diseases have been prevalent during the year.

6. No one particular disease more than another.

7. The contagious or infectious diseases that have prevailed in my circuit, without becoming epidemic, are Measles and Scarlet Fever.

8. No diseases have been attended with an unusual fatality.

9. I know of a family whose little boy ran the risk of Scarlet Fever contagion. He was immediately taken to his grandmother's, some five miles away; in due time he came down but had the fever light. His sister was very anxious to see him, and at the end of four weeks she was allowed to go out to the farm, when she kissed him and played with him; in less than ten days she herself was sick with Scarlitina Maligna and died.

10. I do not think that for the past year there has been any particular locality in town peculiarly unhealthy; people are getting more careful.

11. Some changes have been made during the year, in this locality, in relation to better drainage, more complete removal of extretæ, house refuse, and some effort to promote better sanitary conditions. Keeping cellars free from decomposed vegetables; removing sink-drains from near localities to wells; having the privy farther away from same and keeping the vault clean.

12. The prolonged drouth of the last half of the year had no effect in the production or promotion of diseases. Much to my surprise I had no patients of the eleven hundred that it seemed to have any influence on.

13. I think there has been some advance in public sentiment in regard to the importance of sanitary surroundings. "For by their works ye shall know them;" and I think that will apply here.

14. There are no localities in my circuit which are particularly promotive of pulmonary consumption, gravel, calculus, malarial or any other diseases, but I am of the opinion that our heavy sea fogs are as injurious as anything to many of our residents who have tendencies to pulmonary complaints.

Isaac B. Cowen.

1. Tiverton.

2. The general amount of sickness, of all kinds, in this circuit in 1881, has been about twenty per cent. above the average of other years.

3. Measles prevailed during the early months of the year, which were of mild variety. A few cases of Diphtheria during November and December.

4. During the fall there were a few cases of Typhoid Fever (sporadic).

5. During the last part of the summer very little rain fell, and the streams, wells, and all sources of water supply were very low, in many cases cut off.

6. No diseases of common occurrence, not strictly endemic nor contagious, have had an unusually large prevalence during the year.

7. The contagious or infectious diseases that have prevailed in this circuit, without becoming epidemic, are Typhoid Fever, Diphtheria, and Scarlet Fever.

8. No diseases have been attended with an unusual fatality.

9. Four cases of Diphtheria developed soon after the children had visited friends in Providence, and a few cases were contracted from contact with them. Case of Miss G., who was with her sister, Mrs. ———, who died of the disease, until nearly the day of her death, shows its communicability.

10. All residences bordering upon fresh swamps and marshes I consider as being particularly liable to sickness, especially malaria, yet in these families there has been a remarkable freedom from all sicknesses, considering the location. The effluvia arising from these swamps is very noticeable to one passing over the road after sundown.

11. No changes have been made, during the year, in this locality, in relation to better drainage, or other new measures, public or private adopted, to promote better sanitary conditions.

12. Bowel troubles were prominent, and owing to the concentrated solutions of many wells were more prominent.

13. No appreciable results, and a consequent unbelief in any advance or increased interest in such questions.

14. See previous report.

E. P. Stimson.

1. Portsmouth and adjoining towns.

2. There has been an average amount of sickness, of all kinds, in this circuit in 1881, as compared with ordinary years.

3. No epidemics have prevailed during the year.

4. No endemic diseases have been prevalent during the year.

7. No contagious or infectious diseases have prevailed largely.

8. No diseases have been attended with an unusual fatality.

10. No localities in this circuit peculiarly unhealthy.

11. No changes have been made, during the year, in relation to better drainage, or to promote better sanitary conditions.

12. The prolonged drouth of the last half of the year had no influence in the production or promotion of diseases.

14. There are no localities promotive of pulmonary consumption, gravel, calculus, malarial or any other diseases.

Benjamin Greene.

PROVIDENCE COUNTY.

1. Valley Falls, Cumberland and vicinity.

2. The general amount of sickness of all kinds, in this circuit in 1881, as compared with ordinary years, has been ten per cent. less.

3. No epidemics have prevailed during the year.

4. Intermittent Fever during the fall of average severity.

5. No cause apparent.

6. No diseases of common occurrence have had an unusually large prevalence during the year.

7. No contagious or infectious diseases have prevailed without becoming epidemic.

8. No diseases have been attended with an unusual fatality.

9. Very few cases Typhoid Fever or Scarlet Fever and none of Diphtheria. No new facts developed.

10. No unhealthy locality in this vicinity.

11. No changes have been made during the year in relation to better drainage, or more complete removal of excretæ, house refuse, &c., and no measures to promote better sanitary conditions.

12. If it had any influence it was to diminish the aggregate amount of sickness.

13. No advance in public sentiment to my knowledge in regard to the importance of sanitary surroundings, or increased interest in means of preventing diseases and promoting general health.

14. There are no localities in this circuit which are in my opinion peculiarly promotive of pulmonary consumption, gravel, calculus, malarial or any other diseases.

G. B. Haines.

1. East Providence.

2. The general amount of sickness of all kinds, in my circuit in 1881, as compared with ordinary years, was one-third more.

3. The epidemics that have prevailed in this circuit during the year are Pneumonia, during spring months, followed by Diphtheria, Intermittent Fevers and Scarlatina.

4. No endemic diseases have been prevalent during the year, except Intermittent Fever. Diphtheria and Scarlatina in East Providence Centre and vicinity seemed to have some reference to locality, but could be hardly called endemics.

6. No diseases of common occurrence, not strictly endemic nor contagious, have had an unusually large prevalence during the year.

7. No contagious or infectious diseases have prevailed without becoming epidemic.

8. No diseases have been attended with an unusual fatality.

10. No localities in my circuit peculiarly unhealthy.

11. No changes have been made during the year, in this locality, in relation to better drainage, or more complete removal of excretæ, house refuse, &c.

12. The prolonged drouth of the last half of the year had no perceivable influence in the production or promotion of diseases.

13. No advance in public sentiment in regard to the importance of sanitary surroundings.

14. No localities in my circuit known which are, in my opinion, particularly promotive of pulmonary consumption, gravel, calculus, malarial or any other diseases.

J. L. CHIPMAN.

1. Foster, and towns adjoining.

2. The general amount of sickness, as compared with ordinary years, was, first half of year 10 per cent. more, last half 15 per cent. more.

3. No epidemics have prevailed during the year.

6. No diseases have had an unusually large prevalence during the year.

7. No contagious or infectious diseases have prevailed, without becoming epidemic.

8. No diseases have been attended with an unusual fatality.

M. P. ARNOLD.

1. Glocester, with parts of Burillville and Smithfield.

2. The general amount of sickness, of all kinds, in this circuit in 1881, as compared with ordinary years, was about an average.

3. Measles very prevalent in Burrillville during autumn, and in Glocester in December. Type of great severity in Burrillville, several fatal cases. It had been four years since last occurrence.

4. No endemic diseases have been prevalent during the year.

6. No diseases of common occurrence, not strictly endemic nor contagious, have had an unusually large prevalence during the year.

7. The contagious or infectious diseases that have prevailed in this circuit without becoming epidemic, are Diphtheria and Scarlatina.

8. No diseases have been attended with an unusual fatality.

10. There are no localities in this circuit peculiarly unhealthy.

11. No changes have been made, during the year 1881, in this locality, in relation to more complete removal of excretæ, house refuse, &c., or any other new measures, public or private, to promote better sanitary conditions.

12. The prolonged drouth of the last half of the year did not seem to have any influence in the production or promotion of diseases.

G. A. HARRIS.

1. Lonsdale, Lincoln and vicinity.

2. The general amount of sickness, in this circuit in 1881, as compared with ordinary years, was about an average.

3. Pneumonia, in March, April and May. The proportion of fatal cases was small, even aged people usually recovering. The cases were scattered, i. e. appeared in the villages and in the open country alike. Intermittent Fever, chiefly during October.

4. No endemic diseases have been prevalent during the year, unless Intermittent Fever be allowed under that term.

6. No diseases not strictly endemic nor contagious, have had an unusually large prevalence during the year.

7. A few cases of Diphtheria occurred in January; none afterwards, or, at least, none to my knowledge.

8. No diseases have been attended with an unusual fatality.

10. No localities peculiarly unhealthy, except stated as in previous reports.

11. No changes of importance have been made, during the year 1881, in this locality, in relation to better drainage, or more complete removal of excretæ, house refuse, &c., and no new measures, public, to promote better sanitary conditions.

L. F. C. Garvin.

1. Lonsdale, Ashton and Berkeley.

2. There has been a general average amount of sickness, of all kinds, in this circuit in 1881, as compared with ordinary years.

3. No epidemics have prevailed during the year.

4. No endemic diseases have been prevalent during the year, except Malarial Fever in some localities.

5. No evident cause.

6. No diseases of common occurrence have had an unusually large prevalence during the year.

7. The contagious or infectious diseases that have prevailed in this circuit, without becoming epidemic, are Measles, Scarlatina, Diphtheria, Chicken Pox, and Typhoid Fever.

8. No diseases have been attended with an unusual fatality.

10. Do not know of any localities in this circuit peculiarly unhealthy. As yet have not discovered any.

11. No changes have been made, during the year, in relation to better drainage, or more complete removal of excretæ, house refuse, &c., and no other measures, public or private adopted, to promote better sanitary conditions, except the introduction of Abbott Run water.

12. There was more sickness in the last half of 1880, than during the last half of 1881.

13. I do not think there has been any advance in the public sentiment of this circuit, in regard to the importance of sanitary surroundings; or any increased interest in means of preventing diseases.

14. I think there are no localities in this circuit, which are unusually promotive of pulmonary consumption, gravel, calculus, malarial or any other diseases.

A. E. Kemp.

1. Cranston, and southerly portions of Providence.

2. During the first six months of 1881 no one disease prevailed to any extent as an epidemic. There was some sickness of most all kinds, but the amount was below the average for the corresponding season for the last five years. The latter six months was above the average for the last five years.

3. No epidemic except as in reply to question 4. There was some Diphtheria during the first six months, also some Scarlatina; some Measles, more or less Whooping Cough. Pneumonia prevailed to some extent, though not in a grave form; some lung complications with Whooping Cough. All the above seemed to prevail as *sporadic cases.* But, after the first of July, Intermittent Fever took the field and held it against all other diseases. Not one case of Dysentery; not one case of Typhoid Fever; no Lung Fever; no Diarrhœa; no Cholera Morbus; a few cases of Cholera Infantum; but one could see in every instance more or less traces of *malarial taint* as the ruling feature of the disease.

4. The only endemic disease that has prevailed in my circuit during the year was *Malarial Fever*, in its varied forms and types. Intermittent "Malarial Fever" began to develop itself the very last of June and continued to prevail in that peculiar type until the last day of October as an epidemic. I attended during these four months one hundred and forty-eight cases of well defined Intermittent Fever, (Ague, Chills and Fever). During the last two months of the year it changed its form and type to *Remittent Malarial*; about fifty cases. The circle described is rather an oblong one, and its elongation east and west is two miles plus; its average breadth is probably one mile and a quarter. The population comprised within this circle I should say would not vary much from 4,000. Much of the earthy deposit, fully two-thirds, is alluvial — sandy or gravelly, resting mostly on a base of black alluminous structure mingled with chip-stone, mostly gneiss, which is well nigh impervious to water. About one-fourth of this circle (¼) is in the city limits, and the other three-quarters in Cranston. The Fenner quarry is located on the north western limits of the circle, and is open on the south eastern side of the Arlington highlands. This quarry is located in wet soil with a watery base; is seamy, and many of the seams are open and more or less impacted with earthy deposits. This quarry is open and ranges from northeast to southwest, a quarter of a mile in length and almost perpendicular, from forty to seventy-five feet in height. There has been more cases in the immediate vicinity of this quarry than in any other locality by far in proportion to the number of the inhabitants. I make these statements of facts in order that you can draw your own conclusion. In acordance with what some of the eminent writers have said this might be considered a tangible source of malaria. Then there is one other supposed source I wish to draw your attention to, and that is this: there has been drawn over Cranston street for the last two years, until last fall, on an average two hundred tubs a day, (of twenty-five gallons each), of the contents of privy vaults, cess-pools, and other decomposing matters of all kinds, and deposited either in piles, or heaps, uncovered, or spread broad cast over the surface of most of the vacant lots throughout this circle. Now, the question is, whether so much of this foul material becoming absorbed in this porous soil, until it reaches to the impervious base, and then is given off as a more intensified poison, would result in true malarial miasm. I do not know as there is anything of the kind, but I suggest it as a subject worthy of consideration. I have looked the subject through and I must confess that I think we must look for the cause of this malarial outburst of fever from some other source than either of the four ponds, of which so much has been said. Much of the land where this material has been deposited has not been disturbed or broken up for some time. This may not be a fruitful source of malaria, still, I think it should be taken into account and considered, with other probable causes.

5. I speak of the diseases which have occurred within my circuit of practice.

But the malarial disease has prevailed within a circle, the largest diameter of which would not exceed two miles and a half and the lesser not over one and a half miles, two-thirds of which is located is the north eastern part of Cranston, and the other third embracing territory opposite, within the city limits. The causes which have provoked this, or these, diseases, to me is undefinable. There are four ponds within the circle, but I cannot be made to believe that either of them had but little, if anything, to do with its production. The land is mostly alluvial; subsoil sandy; on a base alluminous, mixed with chipped gneiss, and is well nigh impervious. Then there is a large quarry which, according to authors, might contribute to the work.

6. There have been some cases of gastro-enteric troubles, confined mostly to a class of patients under ten or eleven years of age. But most of these cases might be attributed to, or were the direct result of, malarial taint. There were some few cases of Bronchial Catarrh. Early in the year there was considerable Influenza.

7. There have not been any diseases that have prevailed as epidemics except Malarial Fever. Whooping Cough has prevailed during the year, but rather in sporadic form. Measles have not been very prevalent. Very little Diphtheria in a grave form. Some Cerebra Spinal Meningitis.

8. No diseases have been attended with an unusual fatality.

10. The location embracing that district around the Sprague Print Works might, I think, be set down as an unhealthy locality. I do not think, however, that this spot above referred to is naturally an unhealthy place, but the population is largely composed of foreigners, and many of them of rather a low grade, perfectly careless and indifferent as to their modes of living, regimen, habits of cleanliness, filthy yards and houses, bad water, with many other defects in their sanitary surroundings, which are of vital consequence and by all means should be corrected.

11. None. There has been no improvement in this respect and I fear there never will be until some more stringent measures have been adopted whereby good, wholesome sanitary laws and regulations can be enforced. Cleanliness is one of the first laws of heaven, and it should be so on earth as well. If the people will not keep clean there should be law enough to make them do so, for no person has a right to live in such a manner as to invite disease, and instill into the air they breathe a toxical poison that will endanger the life of their neighbor.

12. It certainly did not aid in the development of disease to any great extent, unless it had some indirect influence in promoting the development of "Malarial Fever." Perhaps this might have been the case in this way: most of the land is alluvial and sandy, based on an alluminous, impervious pan. During the spring and first part of summer the season was wet. This water leached through sandy soil and was held intact on this impervious pan; then came the hot dry weather, and then followed a powerful evaporation up through the sand in the form of Malaria. I do not say that this was the case, but is certainly inferential.

13. But little special interest has been manifested in relation to the subject of sanitary improvement. A man who will not study to know and administer to his own vital necessities, in order to preserve and keep intact the vital forces that sustain the activity of assimilative force, which is a *sine qua non* in keeping up a healthy equilibrium in his own person, will certainly fail to put his own back yard in a healthy sanitary condition, much less care for that of his neighbor.

14. I think not, although I am persuaded through my own observation for many years, that the district spoken of above, that is for a mile or more around the Print Works, is peculiarly a locality wherein the disease known as Tuberculosis largely prevails. I have no doubt that persons carrying latent tubercles by moving into this district will find, after residing some time there, the growth of the tubercle largely augmented; and they will fast ripen into ulceration. I have not found an unusual tendency to gravel or calculus. Malarial disease has been spoken of in another place.

D. H. BATCHELDER.

REMARKS IN REPLY TO QUESTION 9.

I have been in practice between 42 and 43 years, including what time I spent in Europe, which was a gain in experience from the facilities enjoyed in observing the type of disease, and manner of treatment, inside of some forty-five different hospitals in the different nations of Europe. And yet I have thus far failed to find reliable, tangible proof, that either of the above diseases are taken or communicated from one person to another. I have treated more than twelve hundred cases of Scarlet Fever, embracing every type and form; from those of the most simple and uncomplicated to those in the highest type of malignancy; where a whole family, exposed to the same primary causes, had been prostrated in rapid succession, passing through all the stages incident to its most grave type; and not one person outside of this afflicted family had taken the disease. In the autumn of 1844 I was called to attend a family where there were six children under ten years of age. They all came down (not 24 hours between attacks) with Scarlet Fever of the gravest form, accompanied with diptherial throats, of as true and genuine a type as I have ever witnessed. This family residence was within a very few rods of the district school-house, where gathered sixty or seventy children and youth every day, and some of them visited the sick rooms during the six weeks that the disease lingered there, and to my certain knowledge not a symptom of the disease outside the threshold of that house was witnessed by any one in that locality, while the next cases would be in some family a mile away, where they had had no connection whatever with the family who had last had the disease. It prevailed in this isolated manner for three months or more, till I had had in all a hundred and fifty cases, exhibiting as grave a type and character as I ever knew the disease to take on; and in no instance did I observe a case where the patient had taken the disease by coming in contact with any other patient.

Again, in the spring of 1858, after Scarlatina and Diphtheria had prevailed so destructively in Troy, N. Y., during the autumn and winter of 1857 and 1858, it pounced upon the people who resided in the circuit, at and within a mile of the Sprague Print Works, in a malignant form. I had six cases of Diphtheria the first week, and no two cases nearer than eighty rods of each other. It prevailed in my circle of practice from the first of March till the middle of October, skipping many intermediate families and prevailing in no regular order. During these eight months I attended about three hundred and seventy cases, mild and severe, of Scarlatina, a hundred or more of which were complicated with Diphtheria. And here, again, I was unable to detect a single instance where either of the diseases had been conveyed in a direct manner from one family to another, or from one individual to another. I had the first case of Diphtheria in March of 1858, that occurred in Rhode Island after it had received this title, "Diphtheria," by some of the eminent men of New York and Philadelphia, during its prevalence in the city of Troy. I had seen and dealt with the disease long before—while it was known by the *unmeaning title* of *Angina Gravan;* or, *Angina Maligna.* But I am still unsettled in my own mind in relation to the true and legitimate cause of Diphtheria, and, in fact, that of Scarlatina. I can only repeat (what I have gathered from my long experience) and what I think to be the truth, that the cause is in the form of a mysterious agent, which is invisible and beyond the chemist's grasp. It is certainly one of the imponderable agents, known only by its effects; floats only in the atmosphere, and not traceable beyond that medium, to a definite source. Hence, I am persuaded to believe, from facts gathered from every outward source, and my own experience as well, that a person is no more liable to take the disease in the room of the patient than they are in the surrounding atmosphere of the community wherein it prevails. I was called once, some 20 years since, to a little patient, ten years of age, one of five children in the family. I diagnosed the case as Scarlatina well developed. Out of the five children in the family only two had it, the first very severe, and the second only light. In another family, less than fifteen rods distant, there were four children, who were sent away on the same day, six miles distant, to avoid catching the disease. Between four and five weeks after leaving their own home I was called to see one of the four children, which I found very sick with Scarlatina and Diphtheria, apparently of malignant type. Before the week closed they were all four of them seized with the disease in like manner with the first one, which died, while the other three barely recovered.

Now, within a stone's throw of where these children were so sick, there were eleven children under twelve years of age, who had most of them frequented this house, and played with each other up to the time they were stricken down, and not one of them took the disease, or had a symptom of it. It may be said that there might be complete isolation afterwards, but this was not the case, for the neighbors went in and out every day, and watched with the children at night, and if the theory holds good that it is communicated from one person to another, it does seem to me that some of those exposed children would have taken it. Within a circle of about five miles diameter I had, in about three months, about seventy cases, and most of them well marked and severe, and in no case was I able to determine the fact that one person had taken the disease from another. Now, it does appear at least, reasonable, that this most *subtle*, imponderable agent may exist, locally circumscribed and fractionally limited, in *space* and *quantum*, mysteriously changing place, coming in contact with one or more families, skipping others as the case may be, till it spends itself, or passes on in its course to other localities. Or, it may become so diffuse as to impregnate the atmosphere throughout an extensive territory, coming in contact with well-nigh every family resident therein. In the latter case one family is just as much exposed, and as likely to take on the disease as another; that is, if they are alike susceptible; while in the former case, those families which happen to reside in its track are really the only ones exposed. I do not say that a person would not take the disease, under any circumstances in the sick room. What I mean to say is this: admitting, as all do, that the cause is somehow mingled with the elements of the atmosphere, then it follows that it may be universally diffused throughout a given territory, one child is just as much exposed, if they reside in that section, as another, the only difference arises from unlike constitutions, and their variable susceptibilities.

D. H. B.

TYPHOID FEVER.

In relation to Typhoid Fever being communicated from one person to another, I have not been able to discover any facts going to prove, unequivocally, the affirmation of the case. So far as my experience goes to prove anything, it would assist in establishing the theory that the disease is not generally communicated from one person to another in the sick room. I have observed its workings through a period of forty years or more — having had more than one thousand cases to deal with — and am unable to bring forward a single case where the patient took the disease from being exposed to other patients in the sick room. I can bring to mind two cases, where the servant girls, who did the housework outside the sick room, and had nothing to do in the sick room except the emptying the vessels containing the *alvine discharges*. They had each a slight run of Typhoid Fever. I am not under my present impressions disposed to believe that a perfectly well person is very liable to contract the disease by going in and out of the sick room.

D. H. B.

1. Johnston, North Providence, Smithfield, and adjoining towns.

2. The general amount of sickness, of all kinds, in my circuit in 1881, as compared with ordinary years, was as follows: first half more; last half less than usual, and altogether much less than formerly.

3. Scarlet Fever in Stillwater and vicinity; not as severe as sometimes.

4. No endemic diseases have been prevalent during the year.

6. No diseases of common occurrence, not contagious, have had an unusually large prevalence during the year.

7. The contagious or infectious diseases that have prevailed in my circuit, without becoming epidemic, are Scarlet Fever, Diphtheria, Typhoid Fever.

8. No diseases have been attended with an unusual fatality.

9. I have *no doubt* but those diseases referred to are *contagious*, and that the *safety* of the *public* require certain measures to prevent their spread; but that *anybody* knows *just how* or *what* to do, I very much question. I sincerely wish I could throw *some light* on the subject, but cannot do so from any light I have.

10. There are no localities in this circuit peculiarly unhealthy.

11. I believe many improvements have been made, and with good results. The people are, I think, waking from the *old* to *new ideas*.

12. As a rule I have always considered that *drouths* or the *reverse* had much to do with health, but this year I could not see any results.

13. I think there has been, as I have said above, quite a stir in the matter.

14. It may be there are localities in this circuit, which, without being considered generally unhealthy, are becoming promotive of malarial diseases. The question, however, is not well settled.

J. C. BUDLONG.

1. Pawtucket, Lincoln and Cumberland.

2. The general amount of sickness, of all kinds, in this circuit in 1881, as compared with ordinary years, has been about an average.

3. No epidemic has prevailed in this circuit during the year, save Measles, in the early part of the year, originating in 1880.

4. No endemic diseases have been prevalent in this immediate circuit during the year.

6. No diseases of common occurrence, not strictly endemic nor contagious, have had an unusually large prevalence during the year.

8. No diseases have been attended with an unusual fatality.

10. There are no localities in this circuit which I consider peculiarly unhealthy.

11. No changes have been made, during the year, in this locality, in relation to better drainage, or more complete removal of excretæ, house refuse, &c., and no other new measures, public or private adopted, to promote better sanitary conditions, except the extended use of Abbott Run water.

12. The prolonged drouth of the last half of the year 1881, had no influence in the production or promotion of diseases.

A. A. Mann.

1. North Scituate, and parts of adjoining towns.

2. The general amount of sickness, of all kinds, in this circuit in 1881, as compared with ordinary years has been 10 per cent. greater.

3. Whooping Cough prevailed extensively in the village of North Scituate and vicinity, during the early part of the year, and Chicken Pox in same locality during the fall months, both of mild type.

4. No endemic diseases have been prevalent in this circuit during the year.

6. The diseases of common occurrence, not strictly endemic nor contagious, that have had an unusually large prevalence during the year, are Inflammatory Rheumatism and Pneumonia.

7. No contagious or infectious disease has prevailed without becoming epidemic, except Diphtheria.

8. No diseases have been attended with an unusual fatality.

10. No localities in this circuit peculiarly unhealthy, except as reported last year.

11. No changes have been made, during the year, in this locality, in relation to better drainage, or more complete removal of excretæ, house refuse, &c.

12. The following negative facts are the only ones noted: During the latter part of the summer, and the fall of 1880, there were a large number of cases of Typhoid Fever, which were ascribed in part to the drouth of that year; during 1881 (same period), notwithstanding the drouth, there was a remarkable absence of such cases.

13. No advance in public sentiment, in regard to the importance of sanitary surroundings, or increased interest in means of preventing diseases.

14. No localities in this circuit, which are peculiarly promotive of pulmonary consumption, gravel, calculus, malarial or any other diseases.

W. J. Smith.

1. Smithfield, and surrounding towns.

2. The general amount of sickness, of all kinds, in this circuit in 1881, as compared with ordinary years, was rather less; say an eighth (⅛) less.

3. No epidemics have prevailed in this circuit during the year.

4. No endemic diseases have been prevalent during the year.

6. No diseases of common occurrence have had an unusually large prevalence during the year.

7. No contagious or infectious diseases have prevailed in this circuit.

8. No diseases have been attended with an unusual fatality. The death rate has been low.

10. There are no facts to show positively that there are any localities in this circuit peculiarly unhealthy.

11. I know of no general or special sanitary improvements during the year.

12. I can say nothing here very definite; the continued drouth may have given rise to an increase of general sickness during a few succeeding months from its termination.

13. I think there has been a little advancement in public sentiment on sanitary questions within this circuit; it having arisen, no doubt, from a greater general enlightenment on matters pertaining to this subject.

14. I am not able, from any observations of my own, to refer to any localities within this circuit, which seem to furnish more than their proportional amount of the above diseases.

R. P. Eddy.

1 Woonsocket and adjoining towns.

2. The general amount of sickness, of all kinds, in this circuit in 1881, as compared with ordinary years, was slightly greater.

3. Whooping Cough has been very prevalent all over the town; Measles less.

4. No endemic diseases have been prevalent in this circuit during the year, within my personal knowledge.

6. Bronchial affections have had an unusually large prevalence in this circuit during the year.

7. No contagious or infectious diseases have prevailed, except as stated above.

8. No diseases have been attended with an unusual fatality.

10. In lower portions of town, along river banks, where heavy fogs prevail in spring and fall, there are always more of pulmonary and bronchial complaints: and I think the same locations have shown more Typhoid Fever.

11. No changes have been made during the year in this location, in relation to better drainage, or more complete removal of excretæ, house refuse, &c., and no new public measures to promote better sanitary conditions..

12. There was not, I think, so much of sickness, of all kinds, as was to have been expected after the late fall and early winter rains following so much dry weather.

13. While the general sentiment may not be much better, I personally know, from intercourse with them, that many individuals are beginning to think and discuss sanitary measures.

14. There are certain portions of the town, lying upon one of the hills, where for many years some form of disease of urinary organs prevails. Several deaths from Bright's disease and Diabetes Mellitus also, and quite a number of cases of each now existing. Consumption prevails not so much in any particular locality, but rather among a certain class of laborers, viz.: rubber boot makers.

GEO. W. JENCKES.

1. Providence city.

2. The general amount of sickness of all kinds in this city, in 1881, as compared with ordinary years, was as follows: First four months about 10 per cent. greater; second four months an average, and last four months 10 per cent. less.

3. No epidemics having universal prevalence occurred.

4. No endemic diseases have been prevalent during the year 1881, except Intermittent Fever, which occurred largely in the southwest part of the city.

6. The diseases of common occurrence, not strictly endemic nor contagious, that have had an unusually large prevalence during the year, are Pneumonia and Bronchitis.

7. The contagious or infectious diseases that have prevailed in the city without becoming epidemic, are Diphtheria, Scarlatina, Whooping Cough, Measles, Typhoid Fever and Mumps.

8. The diséases that have been attended with an unusual fatality are Pneumonia and Bronchitis.

11. Water has been more largely introduced, and the sewerage of buildings considerably extended. The rules in regard to the sale of unwholesome provisions have also been made more efficient.

12. The drought of the last half of the year, seemed to have no influence in the production or promotion of diseases.

13. Some advance in public sentiment seems to have been made, in regard to the importance of sanitary surroundings, and increased interest in questions appertaining to means of preventing diseases, and promoting individual and general health. Increased inquiry on the part of the general public as to best means of house drainage and ventilation, larger sale of sanitary publications, and enlarged subscriptions to sanitary periodicals.

C. H. FISHER.

WASHINGTON COUNTY.

1. Hope Valley, and parts of Exeter and Richmond.

2. The general amount of sickness, of all kinds, in this circuit in 1881, as compared with ordinary years, has been about an average.

3. No epidemics have prevailed in this circuit during the year.

4. No endemic diseases have been prevalent during the year.

6. The Diseases of common occurrence, not strictly endemic nor contagious, that have had an unusually large prevalence during the year are, Pneumonia, Rheumatism, Croup and Inflammatory Sore Throat.

7. The contagious or infectious diseases that have prevailed without becoming epidemic, are Diphtheria, Scarlet Fever and Measles.

8. No diseases have been attended with an unusual fatality.

10. No localities peculiarly unhealthy.

11. No changes have been made during the year, in this locality, in relation to measures to promote better sanitary conditions.

12. Intermittent Fever has prevailed to some extent, apparently as the result of bogs, and the bottom of ponds and reservoirs being exposed to the action of the atmosphere by low water.

13. No advance in public sentiment of this circuit in regard to means of preventing diseases, and promoting individual and general health.

14. No localities in this circuit particularly promotive of pulmonary consumption, gravel, calculus, malarial or any other diseases.

E. P. Clark.

1. Hopkinton; parts of Richmond, Charlestown and Westerly.

2. The general amount of sickness in my circuit, for the year 1881, has been greater, I should say, by one-sixth than an average.

3. We have had an epidemic of Diphtheria in Ashaway, Potter Hill and vicinity; also in the village of Niantic during the last quarter of the year, of unusual severity, extending over a period of some four months; also of Typhoid Fever, in the village of Plainville, (Richmond,) of the average severity, but no fatal cases, extending through the last five months of the year; also of Varicella.

4. We have had no endemic diseases prevalent during the past year.

6. The diseases that have prevailed to an unusual extent during the past year are, Dysentery, Diarrhœa, Rheumatism and Follicular Tonsilitis.

7. The contagious or infectious diseases that have prevailed in this circuit, without becoming epidemic, are Scarlet Fever and Pertussis.

8. Diphtheria has been unusually fatal.

10. No localities in this circuit peculiarly unhealthy.

11. There have been no changes made during the past year, in my circuit, either public or private, that would ensure better drainage, &c.

12. During the prolonged drouth of the last half of the year the streams were very low, especially the river at Potter Hill, which was kept unusually low for a period of five or six weeks; at or near the expiration of this time, two or three cases of Diphtheria, of a very severe type, originated in families living on or near the banks of the pond. The remaining children of the families were allowed to attend school, and the consequence was, that almost before we knew it, we had the disease spread through the whole neighborhood. At the earnest instigation of the local physicians the school was closed for a period of three weeks, in the months of September and October, and in this way it was checked, not, however, until several lives were lost.

13. There has been no advance or increased interest in sanitary surroundings during the past year.

14. I know of no localities in this circuit peculiarly unhealthy.

A. B. Briggs.

1. South Kingstown.

2. There has been an average amount of sickness of all kinds, in this circuit in 1881, as compared with ordinary years.

3. No epidemics have prevailed in this circuit during the year.

4. No Malarial diseases. A few cases of Typhoid Fever have occurred in the village of Peacedale, three cases on Point Judith, and perhaps one or two other isolated cases.

5. I think the cause of all these cases was in the condition of the drinking water. Wells in this locality have been low, and of the three cases in Point Judith district (all in one family) the water really "smelt bad."

6. No diseases of common occurrence have had an unusually large prevalence during the year.

7. No contagious or infectious diseases have prevailed in this circuit, without becoming epidemic.

8. No diseases have been attended with an unusual fatality.

9. Scarlet Fever I believe to be communicable, both by personal contact and by means of families. Of Diphtheria and Typhoid Fever I believe the case is different, and there must be very favoring conditions to make them to have an appearance of being contagious.

10. No localities in this circuit considered peculiarly unhealthy.

11. No changes have been made during the year, in this locality, in relation to better drainage, or to promote better sanitary conditions.

12. No more than hinted at above.

13. I think some progress has been made in the right direction, and I know of no means more adequate to the subject than the work of the State Board. Old prejudices and peculiarities die hard, and seem ever to have a catlike propensity to recover life; but Truth, though it has an inherent resurrection power, it requires the untiring support of its votaries, because of the natural tendency of the human family to choose evil rather than good.

C. E. Maryott.

1. Westerly.

2. The amount of sickness in 1881 has been about equal to that in ordinary years.

3. No epidemic has prevailed during 1881, yet during the last few months of the year Scarlet Fever was quite prevalent, though hardly reaching an epidemic.

4. A mild form of malaria prevailed from August to November, and no part of my circuit seemed to be exempt, yet the severer cases were usually in the neighborhood of the Pawcatuck river.

5. The same causes which produced the slight endemic of 1880, but more widely spread.

6. No diseases not strictly endemic nor contagious, have had an unusually large prevalence during the year.

7. During the early summer, eight cases of Small Pox occurred in this vicinity, distinctly traceable to two separate points. One from Little Falls, R. I., and one originating from a cloak picked up in Long Island sound and afterwards worn.

8. No diseases have been attended with an unusual fatality.

9. Nothing has occurred to change the views that I expressed in last year's report.

10. Aside from the marshy and low lands adjoining the Pawcatuck river, there is no locality which I consider particularly unhealthy from natural causes. The unhealthy condition of a few isolated places can be ascribed to uncleanliness, and disregard of hygienic rules.

11. One of the mill districts, White Rock, has improved its sewerage to a certain extent.

13. Nothing, except that the town has built a pest-house, which has not been dedicated as yet.

14. Certain localities in which malarial diseases prevail, as stated in answer to No. 4.

H. N. CRANDALL.

REPORTS FROM TOWNS.

It is made the duty of the Secretary of the State Board of Health, to make inquiries of the town clerks, or clerks of the local boards of health, in such towns as have boards of health separate from the town councils, or separate from boards of aldermen in the cities, in relation to the general public health, and to public measures taken to promote the same, as may be seen by the following extract from the Public Statutes of 1882.

CHAPTER 83.

SECTION 6. The Secretary of the said Board shall make inquiry from time to time, of the clerks of town and local boards of health, and practising physicians, in relation to the prevalence of any disease, or knowledge of any known or generally believed source of disease, or causes of general ill-health, and also in relation to the proceedings of the said boards of health, in respect to acts for the promotion and protection of the public health, and also in relation to diseases among domestic animals, in their several towns; and the said clerks of town and local boards of health, and said practising physicians, shall give such information in reply to said inquiries, of such facts and circumstances as have come to their knowledge.

The following circular was therefore sent to the town clerks of the several towns, acting as clerks of boards of health:

CIRCULAR I.

OFFICE OF SECRETARY OF THE STATE BOARD OF HEALTH,

PROVIDENCE, Jan. 1, 1882.

To the Town Clerk of the Town of ——:

At the beginning of the year 1881 a circular was sent to the clerks of local boards of health (town councils or boards of aldermen, unless special boards are appointed,) in all the towns of the State, making various inquiries in regard to the sanitary condition of, and measures taken for the improvement of the same, in their several towns and localities, during the preceding year.

In compliance with section 6 of chapter 83, of the Public Statutes, it is now obligatory and quite desirable that reports should again be made by persons holding the same official positions, in regard to the same general subjects of inquiry. The following questions are therefore presented:

1. What diseases have prevailed to an unusually large extent in your town or district during the past year? If any, please give names; first, that affecting (to the best of your knowledge) the largest number of persons; second, the next largest, and so on. Also the localities where they occurred, and the time of the year.

2. Are there any localities in your town or district which are generally believed to foster any one disease more than another? For instance, consumption, Typhoid fever, malarial disease, &c. If any, name the localities and the diseases.

3. Are there any localities which are believed to be productive of general ill-health, without resulting in special or definite forms of disease? If so, name the locality or localities.

4. Has any widely spread or largely fatal disease, contagious or otherwise, occurred among domestic animals in your town or district, during the year 1881? If any, give name or names, locality and time of occurrence.

5. What regulations have been adopted, or work of a public or private nature contemplated, commenced or completed in 1881, by the consent, or under the direction of the town council of your town, or any legally authorized health officer or board of health in the town, in relation to the promotion and protection of the public health?

An early reply is solicited.

Respectfully,

CHAS. H. FISHER, *Secretary.*

REPORTS FROM TOWN CLERKS

In relation to prevalence of disease, and acts for the promotion and protection of the public health.

BRISTOL COUNTY.

WARREN.

1. None of any account. Last spring a few cases of Diphtheria, but less than the towns around us.

2. No localities in this town, to my knowledge, that foster any one disease more than another.

4. No widely spread or largely fatal disease occurred among domestic animals in this town during the year 1881.

5. General vaccination has taken place, especially among the Irish and French.

HENRY H. LUTHER.

KENT COUNTY.

COVENTRY.

1. No diseases have prevailed to an unusually large extent in this town during the past year, to my knowledge.

2. No localities in this town believed to foster any one disease more than another that I know of, or that I have ever heard of.

4. No widely spread disease occurred among domestic animals during the year.

5. No work of a public nature, under the direction of the town council, except that free vaccination has been furnished to all desiring it.

S. W. GRIFFIN.

EAST GREENWICH.

1. No diseases have prevailed to an unusually large extent during the past year.

2. No localities generally believed to foster any one disease more than another.

4. No largely fatal disease among domestic animals.

5. A thorough vaccination of the inhabitants of the town, ordered by the town council, took place in April and May, 1881, at the expense of the town.

E. STANHOPE.

WARWICK.

1. Do not know that any diseases have prevailed to an unusually large extent in the town, during the past year.

2. Have heard of no localities in the town generally believed to foster any one disease more than another.

4. No fatal disease among domestic animals.

5. No new measures, except free vaccination was given to all in the town who would accept of it. In some districts a great many were opposed to it. About 600 were vaccinated.

BYRON A. ANDREWS.

WEST GREENWICH.

1. None. A few cases of Typhoid Fever in the central part of the town, in the early part of the winter, is the only disease noticeable.

2. There are no localities in the town which are generally believed to foster any one disease more than another.

4. No widely spread disease among domestic animals in town during the year, to my knowledge.

5. Free vaccination for the school children of the town has been provided during the past year.

WM. N. SWEET.

NEWPORT COUNTY.

JAMESTOWN.

1. No diseases have prevailed to an unusually large extent in this town during the past year. There were three cases of Consumption during the spring of 1881, in different parts of the island.

2. No localities generally believed to foster any one disease more than another.

4. No fatal disease occurred among domestic animals during the year.

5. No new measures, except the town authorized free vaccination. Dr. W. A. Watson employed.

J. E. WATSON.

LITTLE COMPTON.

1. No diseases have prevailed to an unusually large extent during the past year.

2. No localities which foster any one disease more than another.

4. No widely spread disease among domestic animals during the year.

5. No regulations have been adopted. No board of health has been organized. The town was vaccinated by me last year, '81.

ISAAC B. COWEN.

MIDDLETOWN.

1. No disease has prevailed in this town to a large extent, during the year 1881. In one house, on Third Beach Road, in the southeasterly part of Middletown, three children, all under five years of age, died within a short period of one another, in the months of February and March. The cause of the death of the oldest child was returned as Scarlet Fever. The physician died before mak-

ing return of the other two deaths. Cause assigned by some to be Measles, but probably the same as in the case of the first child. I know of nothing in the locality of these deaths peculiarly favorable to disease.

2. I think of no localities which have of late years been considered as distinctively unhealthy, or engendering any particular kind of disease.

4. Domestic animals have been singularly free from disease since the beginning of the year 1881. I fail to recall a single instance of an animal affected by any contagious disease.

5. In June, 1881, the town council provided for the gratuitous vaccination of the inhabitants of this town, and especially of the school children. I am of the opinion that few adults availed themselves of this opportunity to be vaccinated, but believe most of the people of this town have been vaccinated at least once in their lives. This I infer from reports which have come to me in a general way.

ALBERT L. CHASE.

PORTSMOUTH.

1. No diseases have prevailed to an unusually large extent during the past year.

2. No localities believed to foster any one disease more than another.

4. No disease among domestic animals during the year.

5. The town council ordered a free vaccination of the inhabitants of the town, last summer, which was attended to.

PHILIP B. CHASE.

TIVERTON.

1. Measles; early months of the year.

2. No localities which are generally believed to foster any one disease more than another.

4. Chicken Cholera, spring and fall; Pink Eye in horses, winter.

5. None, except to employ a physician to vaccinate such as desire it.

GEO. N. DURFEE.

NEWPORT.

1. No diseases have prevailed to any very great extent. Some cases of Diphtheria, and some of Scarlet Fever, but not many families at a time, nor were they of an aggravated form, except in two or three instances.

2. Malarial diseases are unknown. The district west of the Creek, chiefly Houston avenue, is very wet and low. Many streets occupied by foreigners are not as healthy as the average, because of the habits of the residents, but the difference is not so great as would be supposed, mostly in the outskirts. The Point is without descent, but still is fairly healthy.

4. So far as known, no widely spread or largely fatal disease occurred among domestic animals during the year.

5. The new school law induced very numerous vaccinations, and a case of Small Pox near the end of the year, many more. Free vaccination had also been advertised in June. The work of sewering the city has been pushed with great vigor, and the using of the public water is constantly increasing.

W. G. Stevens.

PROVIDENCE COUNTY.

BURRILLVILLE.

1. No diseases have prevailed to an unusually large extent during the past year.

2. No localities which are generally believed to foster any one disease more than another.

4. No widely spread disease occurred among domestic animals.

5. Health officers were appointed in this town. The town was divided up by school districts and several physicians were appointed to vaccinate the inhabitants of the town, at a certain compensation to be paid them for so doing. No returns made of their doings.

Alvah Mowry.

CRANSTON.

1. During last summer and autumn Chills and Fever were quite prevalent in some parts of the town, particularly in the Arlington district in the neighborhood of the ponds in that vicinity. There has also been a good deal of it in the Print Works villages. Scarlet Fever has been somewhat prevalent during fall and winter, but of a mild character generally speaking.

2. The ponds referred to above, some in this town and some in Providence, ninth ward, *may* have something to do with the malarial developments in this section.

4. No widely spread or largely fatal disease, contagious or otherwise, occurred among domestic animals during the year to my knowledge.

5. Free vaccination has been furnished and made as thorough as practicable. Certificates of vaccination are required of all scholars in the public schools. An effort has been made during the year past by the town council, and I think successfully, to control and regulate the depositing in the town of night soil, cesspool contents, &c.

T. C. Lawton,

Superintendent of Health for Town of Cranston.

CUMBERLAND.

1. Intermittent Fever prevailed to an unusual extent, at Valley Falls and vicinity, in the fall of 1881.

2. There are no localities in this town which are generally believed to foster any one disease more than another, to my knowledge.

4. No widely spread disease occurred among domestic animals during the year, to my knowledge.

5. Vaccination was authorized by town council.

Horace A. Follett.

FOSTER.

1. No diseases have prevailed to an unusually large extent in this town, during the past year, to my knowledge.

2. No localities believed to foster any one disease more than another.

4. No disease occurred largely among domestic animals in the town, during the year.

5. No regulations, except the town council has provided for free vaccination.

Geo. W. Phillips.

GLOCESTER.

1. No diseases have prevailed to an unusually large extent during the past year.

2. No localities which are generally believed to foster any one disease more than another.

4. No largely fatal disease among domestic animals.

5. No new regulations, except there has been public vaccination, well attended to.

Chas. W. Farnum.

LINCOLN.

1. No unusual disease, except Small Pox in May and June; six or eight cases, and one death.

2. No localities believed to foster any one disease more than another.

4. No largely fatal disease occurred among domestic animals.

5. No new regulations have been adopted by the town council of this town, in relation to the promotion and protection of the public health, except as follows: (Chapter 872 Public Laws, Sec. 1.) The law in relation to vaccination of children attending public schools has been fully and thoroughly enforced, and a certificate given, resulting in quite a large number of vaccinations.

William H. Gooding.

NORTH PROVIDENCE.

1. No diseases have prevailed to an unusually large extent during the past year, to my knowledge.

2. There are no localities in town which are generally believed to foster any one disease more than another.

4. No largely fatal disease among domestic animals during the year.

5. No regulations have been adopted by the town council, in relation to the promotion and protection of the public health, and nothing has been done in regard to vaccination. It was talked about to some extent, but the matter was finally dropped.

Thomas H. Angell.

SCITUATE.

1. No diseases have prevailed to an unusually large extent.

2. No localities which are generally believed to foster Consumption, Typhoid Fever, malarial disease, or any other in particular.

4. No largely fatal disease occurred among domestic animals.

5. No new regulations, except vaccination was ordered, this January, 1882.

D. H. Remington.

PROVIDENCE CITY.

1. The diseases that have prevailed to an unusually large extent in this city, during the past year, are Pneumonia and diseases of the respiratory passages during the first four months of the year, and Intermittent Fever during August, September and October.

2. The southwesterly section of the city favors the production of Intermittent Fever.

3. The localities which are believed to be productive of general ill-health, without resulting in special or definite forms of disease, are only those deficient in effectual and proper drainage, with unsanitary surroundings, and among the classes disposed to dissipation, of filthy habits and living on unhealthful food.

4. The Pink Eye (so called) prevailed quite largely among horses, but without large fatality, and Spinal Meningitis, also among horses, and less largely, but with much greater fatality.

5. The regulations adopted, of a public nature, in relation to the promotion and protection of the public health are as follows:

RULE RELATIVE TO UNWHOLESOME PROVISIONS.

[Adopted August 4, 1881.]

Chapter xii of the rules and regulations of the board of aldermen, is hereby amended so as to read as follows:—

1. It shall be the duty of the superintendent of health, to visit from time to time and at frequent intervals, all places within this city where fruit, vegetables, meat, fish or other provisions liable to become decayed, diseased or unwholesome, shall be kept, offered, or exposed for sale, and if he shall find, or be informed, that any of said articles so kept, offered or exposed for sale, are decayed, diseased, or unwholesome, he shall forthwith carefully inspect the same, and if in his opinion the same are decayed, diseased, or unwholesome, he shall prepare a certificate in writing, which shall contain a true statement of the nature, condition and quantity of the same, of the place where the same were found, and the name of the owner thereof, or of the person in whose possession the same were found, and after signing said certificate in his official capacity of superintendent of health, he shall file the same in his office, and send a copy thereof to the mayor.

2. After filing said certificate in the office of the superintendent of health, said officer shall issue an order in writing directing the immediate seizure and destruction of said articles named in said certificate, which order may be executed by any of the police constables of said city, to be detailed by the chief of

police for said purpose, under the immediate supervision of said superintendent of health.

3. The officer executing said order as aforesaid, shall make immediate return, signed by him on the back thereof, of all his doings thereunder to the chief of police, who shall transmit the same to the mayor within twenty-four hours after the execution thereof.

WASHINGTON COUNTY.

CHARLESTOWN.

1. No diseases have prevailed to an unusually large extent in this town during the past year.

2. There are no localities in this town which are generally believed to foster any one disease more than another.

4. No widely spread or largely fatal disease, contagious or otherwise, among domestic animals during the year 1881.

5. No regulations have been adopted, or work of a public nature commenced, in 1881, by the town council of this town in relation to the promotion and protection of the public health, except in June. 1881, the town council ordered vaccination, which was performed at district school houses by A. H. Eccleston, M. D.

George C. Cross.

HOPKINTON.

1. The disease that prevailed to an unusually large extent in this town during the past year, was Diphtheria. Vicinity of Ashaway and Potter Hill; also vicinity of Ashville.

2. No localities known which are generally believed to foster any one disease more than another.

4. No largely fatal disease occurred among domestic animals during the year.

5. No new regulations adopted by the town council, except that the inhabitants have been vaccinated at expense of town.

E. R. Allen.

RICHMOND.

1. No diseases have prevailed to an unusually large extent in this town during the past year. Has been a general time of health.

2. No localities generally believed to foster any one disease more than another.

4. No largely fatal disease among domestic animals.

5. As to new regulations, nothing further than vaccination in June last.

H. P. Clarke.

SOUTH KINGSTOWN.

1. Typhoid Fever prevailed to a somewhat unusually large extent during the fall and winter.

2. No localities which are generally believed to foster Consumption, Typhoid Fever, Malarial disease, or any other in particular.

4. No largely fatal disease occurred among domestic animals during the year.

5. Town Council ordered vaccination at school houses in 1881, which was done by Drs. C. E. Maryott and H. L. Stillman.

J. G. PERRY.

METEOROLOGY.

A comparison of the monthly reports of meteorological observations made in nearly all the different towns in the State in preceding years, showed, at the close of the year 1880, that the differences in the mean temperature of the atmosphere, the mean humidity, amount of rainfall and degree and frequency of fluctuation in each, were not very dissimilar.

It was then determined, that instead of calling for observations in all the towns, two locations should be selected in which the observations made would cover all the differences, whatever they might be, between the meteorological conditions of the towns lying on the seashore and bay, and those lying more inland.

The cities of Providence and Newport seemed to be so situated as to practically accomplish with sufficient completeness the purpose desired.

In order, therefore, to present a general summary of the meteorological conditions prevailing throughout the State, in each of the several months of the year 1881, recourse has been had to the Signal Station at Newport, under charge of Col. Wm. McGillivray, Sergeant Signal Corps U. S. Army, and the office of S. M. Gray, City Engineer of Providence.

The tables, kindly furnished from each of these sources, will be found on the following pages. The observations reported at the City Engineer's office in Providence were made at the City Hall, and at the pumping stations of the city water works in Providence and Cranston:

CITY ENGINEER'S OFFICE, PROVIDENCE, R. I.

Temperature, Rainfall and prevailing direction of the wind, for each month during the year 1881.

1881.	TEMPERATURE.								
	Monthly Mean.	Maximum.	Minimum.	Monthly Range.	Greatest Daily Range	Least Daily Range.	Average Daily Range.	Total amount of Rain or Melted Snow in inches.	Prevailing Direction of the Wind.
January.......	22.1	43.	4.	39.	35.	7.	16.1	6.80	N. W.
February......	27.2	51.	—4.*	55.	40.	8.	15.6	7.30	S. N. N. W.
March........	36.3	53.	25.	28.	18.	3.	11.1	6.30	N. W.
April.........	43.9	73.	22.	51.	28.	5	17.2	1.88	N. W.
May..........	58.0	89.	35.	54.	34.	4.	20.2	2.72	Variable
June....	63.0	85.	45.	40.	31.	4.	17.8	7.35	N. W.
July	70.9	87.5	56.	31.5	25.	10.	17.9	4.93	Variable
August..... .	70.4	91.	55.	36.	28.	5.	15.4	.59	S.
September....	67.9	96.	49	47.	25.	6.	15.5	2.44	Variable
October.......	55.3	86.	31.	55.	47.	10.	20.9	2.97	Variable
November....	42.7	67.	19.	48.	25.	5.	14.9	5.60	N. W.
December.....	37.9	61.	12.	49.	37.	6.	17.7	4.08	Variable

*Below zero. Mean temperature for the year 1881 was 49.6° Fah. Total amount of rain or melted snow, 52.96 inches.

NOTE.—The maximum and minimum thermometers are not read on the Sabbath; therefore the *daily* ranges were computed, considering the reading from Saturday to Monday as one.

SIGNAL SERVICE STATION, U. S. A. NEWPORT, R. I.

Temperature, Rainfall and prevailing direction of wind, for each month during the year 1881.

1881.	TEMPERATURE.								
	Monthly Mean.	Maximum.	Minimum.	Monthly Range.	Greatest Daily Range.	Least Daily Range.	Average Daily Range.	Total amount of Rainfall or Melted Snow (inches).	Prevailing Direction of Wind.
January.......	26.1	48.5	5.0	43.5	21.0	9 0	14.0	5.70	W.
February......	29.4	50.0	—2.0*	52.0	26.5	8.0	15.0	8.28	N. W.
March.........	37.4	53.0	25.5	27.5	20.5	6.0	11.2	8.24	W.
April..........	42.7	62.5	22.5	40.0	28.0	7.0	15.3	2 11	W.
May...........	54.2	85.2	39 0	46.2	33.2	5.4	13.4	2.90	S. W.
June...........	61.4	82.4	44.8	37.6	21.5	5.6	14.9	5.94	S. W.
July...........	68.8	86.9	57.5	29.4	20.9	5.9	13.8	0.87	S. W.
August.........	68.7	85.1	53.6	31.5	20.1	4.9	12.4	0.86	S. W.
September.....	66.7	88.3	51.0	25.6	23.2	4.9	11.8	2.65	S. W.
October........	56.3	77.9	33.8	44.1	26.7	4.2	14.6	2.46	S. W.
November.....	46.1	62.8	20.3	42.5	24.6	4.6	13.8	5.52	S. W.
December	40.6	60 0	15.3	44.7	33.0	6.4	13.8	3.41	S. W.

Mean temperature of the year 1881, 49.9 deg. F. Total amount of rain and melted snow, 48.94 inches.

*Below zero.

WM. McGILLIVRAY,

Sergeant Signal Corps U. S. A.

Examined and corrected at the office of the Chief Signal Officer, U. S. A., Washington, D. C. April 21st, 1881.

CATTLE COMMISSION.

No widely spread or largely fatal disease occurred among the domestic animals of the State, during the year 1881.

ANTHRAX.

In the month of May there were several localities in which horned cattle just turned out to grass, were seized with chills (though not always noticed), followed by lassitude, indisposition to eat, or move about, tremblings more or less apparent, and occasionally death in from six hours to six or eight days. In some localities the proportion of deaths was a small fraction of the whole number sick, while in other localities the fatal cases comprised the larger part of the entire number affected.

Such occurrences have been naturally alarming to the owners of stock in the near vicinity of such places, and not infrequently the owners of animals thus affected have had strong suspicions that they had been poisoned.

The disease is not an epizootic of a contagious character, and therefore likely to spread largely, but seems to be due entirely to local infection or influences, and not communicable to animals at a distance from the premises where the disease originates. The disease does not occur in the same place year after year as might be expected, and the cause is enveloped in considerable obscurity.

The disease is sometimes called by veterinary physicians splenic apoplexy, from the fact that in all cases where examinations have been made after death, the spleen of the animal was invariably found enormously enlarged, and filled with black, tarry blood, uncoagulable, and having the appearance of having undergone decomposition before the death of the animal. The spleen was also in a softened state, easily torn, and in some cases scarcely holding together when held up by one end.

No other structural change was invariably found, and not infrequently no other pathological condition.

Whether the disease is caused by some malarial emanations from the low grounds where it has always originated, or is caused by some minute vegetable growth, fungus, smut or mildew, on or with the grasses upon which the cattle feed, is now only a matter of conjecture. It was the design of the Secretary to have given this disease a particular investigation during the year, and a more extended description in this Report, but other duties were more pressing, and the opportunity was not found.

GLANDERS.

The usual care and attention in the direction of the discovery of glandered horses, has been continued through the year.

The following remarks from the last previous report, will apply equally well in the present connection:

The difficulty in detecting the disease in its earliest stages from the similarity of the symptoms to other nasal diseases, with the frequent disposition of the owner upon discovery of suspicious appearances to take measures to hide or remove such appearances from general observation, and especially when the symptoms of the disease are more definitely declared to dispose of the animal as soon as possible in places where the disease will be the least likely to be noticed, continues to protract the time when the animal will be reported to the Board. At the same time a large number of suspected cases are reported, which upon examination prove to be only nasal catarrh, or some non-contagious, acute or chronic disease of the nasal passages.

The number of cases reported suspected of being glanders and not found such, far exceed the number found to be glanders or farcy. The proportion of the suspected cases visited to the proven cases is more than four to one.

The tract entitled "Glanders and Farcy" has been kept in supply in places where horsemen congregate, and has been distributed singly to persons whose occupations or pursuits brought them frequently in contact with considerable numbers of horses.

The number discovered and destroyed during the year 1881 was nineteen. This was a great reduction from previous years, the number for the last four or five years running from about fifty to over one hundred. It is not probable that the year 1882 will show so small a number, for reasons given above.

Of the nineteen horses destroyed because of having glanders, nine were found in the city of Providence, three in the town of Cranston, three in East Providence, two in Lincoln, and two in Johnston.

OTHER DISEASES.

The attention of the Secretary was called during the year to other forms of disease among domestic animals of different kinds, but with the exception of the Pinkeye and Spinal Meningitis in horses, they were of an innocuous and mild character, or limited to a single stable or farm, and were in no measure a source of danger to the property of outside parties.

The Pinkeye prevailed just at the close of the year, and was only fatal when complicated with some other disease, and Spinal Meningitis, though frequently fatal, was confined to single stables.

In the discovery of glandered horses, the Secretary desires to acknowledge the valuable services of Dr. N. A. Fisher, Gen. Agent, and Charles H. Thurber, Pros. Agent of the Society for the prevention of Cruelty to Animals, Drs. Peabody and Scrutton, veterinary surgeons, and the police force of the city of Providence.

MALARIA
IN RHODE ISLAND.

BY

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MALARIAL DISEASE IN 1881.

Since the first appearance of the present endemic of malaria in Rhode Island, interest in the subject has steadily increased, both among the profession and the laity. The question is asked on all sides, why is it that this exasperating enemy which we have so long escaped, should now appear in our midst. Naturally the profession is expected to answer it, but this unfortunately it is not at all able to do. To explain completely and satisfactorily the origin and cause of malarial disease, is what medical men have long been striving to do. In order to build up a theory it is necessary first to collect a sufficient number of facts to work upon, and as the advent of a new disease is manifestly the most important time to secure data concerning it, the writer felt that it would be of interest to determine the location of as many cases as possible of malarial disease occurring in Providence during the year 1881. Afterwards the privilege was granted by the Secretary of the State Board of Health, of arranging the statistics that he had been able to collect from the various towns throughout the State. Outside of Providence replies were received from twenty-nine physicians. Of these, twenty, representing fourteen towns, reported having from two to two hundred cases of malarial disease last summer. Nine physicians, representing seven towns, reported having seen no cases of the disease. It is extremely probable, also, that the remaining towns which were not heard from, were also exempt from it. The towns free from it were in the northwestern part of the State, and along the southern shore and on the islands. The various reports will now be considered in detail.

Barrington.—From the fact that no physician is resident in this town it is very difficult to obtain accurate statements in regard to the prevalence of any particular disease. Physicians from the neighboring towns and from Providence are called upon to furnish medical attendance, and it is only by conversation with them and with the inhabitants of Barrington that any reference can be made to malarial disease in that place.

The workmen employed at the brick-yard near Nayatt Point, were the first persons attacked in 1880, and during that summer nearly every one had, at some time, intermittent fever. The works are situated a short distance from the shore of the bay, at the head of a creek that communicates with salt water, and the whole district is very low, varying from one to ten feet above high water mark, and is covered with swamps and marshes. In 1880 nearly every one of the employees (French Canadians) were sick with chills and fever. That year a shallow pond, some quarter of a mile west of the lodging house where the workmen slept, was drained completely bare for the first time in many years. Thinking that perhaps the exposed bottom of this pond might have been the cause of the appearance of the chills and fever, the Brick Company last season determined to keep it well flowed, and also to thoroughly renovate the lodging house and its surroundings, and to import an entirely new set of hands. This was done, but intermittent fever again appeared, though it was not quite so prevalent as it was the year before. Even if the pond bottom spoken of was the chief cause in producing the cases of disease in 1880, it could scarcely be possible that it was the only cause, for the numerous swamps, pools and ponds which exist in this region present such points of similarity that it seems very probable that if one of them has anything to do with chills and fever they all have, and last summer's experience confirms this view.

At Nayatt Point, a projection of land, the highest in the town, extending into the bay, a number of cases occurred among the summer residents. There is no reason, however, to suppose that the malarial poison was developed at the Point itself, but it was probably blown over from the brick-yard, or else the people contracted the disease while riding through the swamp, to and from the depot.

At Drownville, about a mile north of the brick-yard, there were a great many cases in 1881, considerably more than the year before.

No portion of the town was entirely exempt, but it was noticed that generally more cases occurred in the immediate vicinity of the swamps than elsewhere. The soil is generally sandy and gravelly, except at the brick-yard, where it is, of course, clayey. There was no especial excavating in progress besides that connected with the manufacture of bricks. On the whole, it will probably be admitted there was more malarial disease in Barrington in 1881 than in 1880.

Cranston.—Dr. King reported five cases of malarial fever on high land, not far from the Print Works. Dr. Batchelder reports having a very large number in this town during 1881. He attended in Cranston about one hundred and fifty cases of malarial disease, besides fifty just over the line in Providence, which were situated in the Mashapaug Pond district, and will be considered in the statistics of that section. Nearly a quarter of these cases were of a remittent type, the others typically intermittent. Fifty cases of malarial disease occurred in and around the villages at the Print Works, while the remainder extended, in somewhat decreasing numbers, westward from the city line towards that point. The larger number was clustered around what is known as Fenner's Quarry, situated on the eastern slope of a considerable hill, and distant perhaps three quarters of a mile from Spectacle Pond, the marshy condition of which will be described further on. Notwithstanding the fact that this hillside has a considerable elevation above the neighboring fields, Dr. Batchelder describes the soil as "wet and springy, and covered in places with rank vegetation." Indeed, the soil of the whole town is rather heavy and moist, and there are numerous ponds and wet, marshy places scattered about over its whole area, though Dr. Batchelder says that malarial disease was not any more prevalent close to such places than it was at some distance. But we must remember that the section here described is so limited that even one malaria-breeding place could easily furnish poison for all the one hundred and fifty cases reported. The fact that many of the persons attacked lived at the distance of a mile or more from a certain marsh, and a hundred feet or so above its level, does not prove that the malarial poison may not have travelled, by laws that are pretty generally admitted, from such marshy region. While malarial disease was so prevalent during 1881, it was not its first appearance, for isolated cases were noticed here the year before, as they were also just over the line in Providence.

Central Falls.—Four or five cases are reported here, but no definite facts in regard to them are given.

East Greenwich.—Malaria appeared in East Greenwich for the first time in 1881. Some cases of the disease were in the vicinity of the Print Works, "near a brook and piece of swampy land, over which the mists hang nearly every night." Other cases occurred on Potowam Neck, and in the southern part of the town, and although the soil immediately about them was sandy and well drained, there were not far distant, "in the one place boggy land and in the other a small pond." The reporting physicians attribute the disease to the emanations from the swamps and ponds. A single case occurred at the Buttonwoods in Warwick, near a swamp.

East Providence.—Forty cases or more of malarial fever, mostly of an intermittent type, are reported as coming under the observation of the physicians in this town during 1881. The most of them were in the southern part, near Barrington, and were in the vicinity of low, wet lands. Some few cases were in a more elevated region, and in the midst of apparently healthy surroundings. Some of the patients lived in the northern part of the town, near the mouth of the Ten Mile River, and some were in the immediate neighborhood of considerable excavations. The soil disturbed consisted largely of vegetable material. No causes are assigned by the physicians. A few cases were observed the year before, but none previously.

Foster.—One or two cases occurred, upon the banks of a stream.

Hopkinton.—There were a few cases, but no particulars were given as to their location.

Johnston.—Two cases are reported, near the Providence line.

Lonsdale.—From ten to twenty cases occurred here, and the physicians report that the most of them were near "low, marshy ground covered with rank vegetation, and subject to flowage and drainage."

Newport.—It is said that no marked cases of intermittent fever were noticed in Newport last summer, and there is no history of any there for many years. But the physicians of the city are inclined to think that a malarial element was at work there, changing to a certain extent the character of other affections. But no one locality seems to have been visited more markedly than another.

Pawtuxet.—About twenty cases are reported here for 1881, of which twelve were intermittent, the rest remittent. It is its first appearance in the place. Two only of the cases were on the north side of the river, and were in the vicinity of excavations for gas and water pipes. The rest were on the south or Warwick side of the stream. The valley of the Pawtuxet is here very low, and is bordered by swamps, as are many of the little brooks which flow into the river. One case at some distance from the river was close to a swamp, and one was directly on the borders of a pond.

Pontiac.—Ten cases of intermittent fever were reported for this village. They were all on low land, which had been made by filling in. They were not far distant from the river, which has very low banks here, and which had an unusually small amount of water last summer. To this the resident physician attributes the appearance of the disease.

Providence.—A few cases of intermittent fever occurred in Providence three years ago, but none were publicly reported till the summer of 1880. There were only a few cases reported that year, probably not more than a score in all, and all of them were in one locality, the vicinity of Mashapaug Pond. During 1881 a large number of cases were reported, and in order to ascertain their exact location enquiries were made of one hundred and sixteen practitioners. Replies were received from seventy-six. Of these, thirty-four reported cases, and forty-two reported having none. Three or four physicians practicing in a region to be mentioned, had a very large number of cases each, while of the remainder scarcely any one had more than half a dozen. In all there were about three hundred and fifty-two cases reported. Probably the whole number affected by the disease was nearer twice that, as a great many sick with chills prescribed for themselves, or applied to a druggist, and so did not come under the notice of physicians.

Of the whole number of cases about two hundred and forty were within a half-mile of Mashapaug Pond. The population of this district, as nearly as could be estimated, is about twenty-five hundred, hence the proportion of those affected was nearly as one is to ten, while over the rest of the city it was not so high as one in a thousand.

The pond itself is quite deep, with bold and generally sandy shores, and the water is by no means stagnant. In the summer time, however, it is covered to a greater or less extent with a bright emerald green material, which consists of a low form of vegetable organism. This, however, so far from being a source of impurity, as many of the dwellers upon the banks of the pond supposed, really renders the water purer and sweeter than it otherwise would be. But while there are no marshes or stagnant pools along the shores of the pond itself, there are such spots in its immediate vicinity. To the south the pond empties itself by a small stream, which flows for a considerable distance through wet, swampy meadows. In the houses near this outlet and along the course of the stream many of the cases of malarial disease occurred. A few rods to the westward of Mashapaug Pond, and connected with it, is another pond of far different character, known as Spectacle Pond. This is, however, just over the line in Cranston. This pond has been raised at times above its natural level and then drawn off again, so that the shores, which were naturally marshy, have been rendered far more so. The greater portion of its borders consists of swamps, filled with more or less dead vegetable material, killed by the changes in the water level. Upon its surface may be seen some of those floating islands formed of trees, shrubs, stumps and a matted mass of roots, that occasionally form in our artificial ponds. The area affected by intermittent fever began within a few rods of this pond, and extended northeast — the direction of the prevailing winds during the summer months, for a half-mile or so along the shore, and beyond the extremity of Mashapaug Pond. The Stonington Railroad passes through the midst of this district, and on each side of the road-bed are a number of small, stagnant pools. These are partly formed by the railroad embankment, and have a very imperfect outlet. The neighboring houses are built on their very margins, and in many cases the privies are placed directly over them. Their foul appearance during the summer time indicates that they contain a large amount of decaying animal and vegetable matter.

It was in this region that the cases of intermittent during last summer were a hundred times as numerous in proportion to the population as in all the rest of the city. But the other cases were by no means evenly distributed. Directly north of the Oriental Mill, in the north part of the city, is a shallow pool, and around its border twenty-six cases of intermittent fever were reported. Another small group of eight cases was in close proximity to a half salt, half fresh water marsh, near Red Bridge. None of the affected districts are of any elevation, and the sub-soil is sandy and gravelly. The wet and marshy places spoken of were not of recent formation, but they may have been in a somewhat worse condition than usual last summer, on account of the exceptional dryness of the season.

Smithfield.—Two cases occurred in the northwest part of the town, quite near mill ponds.

Valley Falls.—Probably there were from thirty to forty cases in and around Valley Falls last summer. The soil here is generally dry and sandy, and portions of the region affected are somewhat elevated. There are, of course, along the Blackstone River, numerous ponds and small streams, and as the summer of 1881 was an exceptionally dry one, more of the river bottom was exposed than is usual. But the physicians practicing here did not find that the majority of the cases were in the immediate vicinity of such localities. They do, however, report that the most of them were along the line of pipes carrying the Pawtucket water supply, the excavations for which were made last summer, and which, of course, necessitated the exposure of a great deal of fresh soil.

Warren.—The first cases occurred in this town during 1881. One physician reports from ten to twenty cases. In nearly every instance he says they occurred in the vicinity of "low, marshy tracts, or near pools which were either filled with stagnant water, or else with bottoms exposed on account of the exceptional drought." The sub-soil was largely clayey. None originated on elevated land. The disease was attributed to "the presence of decaying vegetation in newly opened ground, in marshy districts, and in the dry ponds."

Westerly.—Malarial disease had previously appeared in this town, but it was much more prevalent during the summer of 1881 than it had ever been before. A part of the cases occurred in a region bounded on one side by the Pawcatuck River — with lowlands covered with rank vegetation intervening. This tract is sometimes covered with water, sometimes bare. On another side is an extensive swamp. Another set of cases were in a region adjoining this, one of greater elevation and with a dry soil, but over which the ordinary summer breeze blew directly from the swamp above mentioned. Still other cases occurred upon the highest elevation in the town, but it is supposed that very few of them really originated there. There had been no upturning of the soil, except such as was incident to the building of a number of new houses. The physician who made the observations came to the conclusion that among the "conditions necessary for the development of the malarial poison in that town are decaying organic matter, with a certain amount of moisture and heat."

Woonsocket.—The physicians here report that cases have been occasionally seen for many years, but from the floating character of a large part of the population, it is probable that they did not originate within the State limits. Last summer a few cases were undoubtedly developed in the town. Some of them were on "low land (originally swampy) near sewer openings, and surrounded by filth of various kinds." In one or two instances the tenements occupied by those affected were exceedingly damp and poorly drained. Other patients lived "in the lower, if not lowest portion of the town, not far from the river, where fogs prevail." No cases are reported as developing in elevated parts of the town. The soil in the region affected is moist and clayey. One of the physicians who made the report was himself attacked by the disease, and he considers its development unquestionably to be due to imperfect drainage.

From a review of the facts above given, it appears that though a few cases of malarial disease had been noticed in the State prior to 1880, that was the first time that any serious outbreak had occurred in many years, in fact since the early settlement of the colony. During the summer of 1880 intermittent fever, which had been slowly approaching us from the valley of the Hudson, seemed to gain a firm foothold on Rhode Island soil, and a very serious endemic occurred at the works of the Nayatt Brick Company, in Barrington. Only a comparatively few cases were reported from Providence and one or two other places. In the summer of 1881 it had certainly not decreased in Barrington, and had increased to an alarming extent in Providence and other towns which had been only slightly visited before, and appeared to the extent of a considerable number of cases, in many places hitherto exempt. The regions that were particularly affected were the low-lying portions of Westerly, the town of Barrington, the lower portion of the valley of the Pawtuxet River, together with the region drained by the streams there flowing into it, and the valley of the Blackstone, especially from Central Falls to the Massachusetts line. All these regions abound in marshes, swamps and reservoirs, subject to frequent and great change of level. The sub-soil is usually sandy and gravelly, more rarely clayey. Unusual excavations were in progress in one or two places. The streams and reservoirs were unusually low on account of the severe drought, but, on the whole, it would be rather unreasonable to say that the difference in the physical conditions of these places last summer was the cause of the prevalence of malarial disease. Neither were the atmospheric conditions so different from those of former years as to warrant the theory that we could here find a sufficient cause for the development of malaria. Almost the only general statement that can be made after a review of the reports from the several towns, is, that malarial disease first appeared in the immediate vicinity of low, wet regions, and that during last summer the *immense majority* of the cases occurred within a short distance of such places, a few occurred near excavations, and some very few apparently had no connection with either. Except in rare instances, there seemed to be no relation between the disease and imperfect sewerage. Such being the facts, let us see how they accord with current theories.

A great many views in regard to the cause of malarial diseases have been advanced at different periods. Some writers have thought it is to be found directly in meteorological conditions, chiefly prolonged heat and marked diurnal variations in temperature; others think that these affections are due to an excess of ozone in the air; others still to the development of certain poisonous gases, produced by decaying vegetable material. But by far the greater number of observers for the last thirty years, have believed that this class of diseases was due to the presence in the air we breathe, or the water we drink, of minute vegetable germs, and that these, after remaining in the body a certain time, produce the characteristics of malarial poisoning. Which one of these disputed views is correct, is, of course, not for us here to affirm, but whether it be a poisonous gas or a vegetable germ, or some other undiscovered agent, we must admit that there is a distinct and specific malarial poison, which alone is capable of producing the class of diseases that we are here considering. Such a poison is probably somewhat similar to the poisons which produce the other infectious and contagious diseases, such as yellow fever, cholera, small-pox, measles, etc.

But while we do not know exactly *what* the immediate and efficient cause of malarial disease is, we do know very many of the conditions under which it is active.

1. Malaria, by which is meant the malarial poison, requires a period of incubation, just as yellow fever and measles do, and this may vary from a few hours to many months. The period of exposure, too, may may be very brief, a very few hours is often amply sufficient. All persons are not equally susceptible. Some probably would never contract it. By constant exposure, also, persons become accustomed to this as to other poisons, they become acclimated by living in a malarious country. Unfortunately, when once taken into the system it is very difficult to get rid of. It is a curious fact that a person frequently experiences an attack immediately after removal from a malarious district.

2. Malaria is not developed until the minimum temperature rises above 57°, and so it is rare for it to appear till the summer is well advanced. It may then continue to be produced until the thermometer marks 32°, which temperature effectually checks its development. But it must be remembered that many cases that contract it in the fall do not have any manifestations till well into the winter.

3. The development of malaria requires moisture and the presence of dead vegetable matter. The favorite places for it are along the sides of swamps, marshes, pools, low and shallow rivers, and those that periodically overflow their banks. A rapid and deep stream with bold banks, and ponds with steep and sandy shores, are not usually its starting points. A superabundance of water plays the same part in preventing malaria that an entire absence of water does. Thus it is found that a marsh may be made perfectly healthy by keeping it completely covered with water. Salt water marshes do not give rise to malaria, but flats flowed by brackish water are the most dangerous of malaria-breeding places. As it has never been shown that decaying animal matter can give rise to this poison, there can be no especial danger in this regard to be apprehended from sewage.

But to the idea that the source of malaria is usually to be found in swamps and marshes, it is objected that these physical conditions have existed nearly as they are now for fifty years or more, and that during all that time they have given forth no malarial poison, and it cannot be that they are the cause of it now. One writer says, "The mere presence of malarial disease near marshes does not prove that it originates in the marsh, any more than salmon in a river prove that the river generates the fish." Certainly not. Marshes are not the cause of malarial disease, merely one of the essential conditions for the development of the cause. If we drained the river, we should kill the salmon, and if we drained the marshes along its banks we should probably kill the cause of the intermittent fever occurring there. This, after all, is the best proof of the connection between malaria and moisture. The marked diminution in malarial disease that has taken place where wet regions have been drained, is shown by numberless instances, both in Europe and this country, and has established beyond question the relation between the two.

4. Malaria is very apt to be developed where earth is freshly turned up. Here we have plenty of decaying vegetable matter in the moist soil. When fields long undisturbed are brought under cultivation, when excavations are made for cellars, and for the laying of drains, water and gas pipes, etc., and cutting and grading is being carried on for the building of streets and railroads, malaria, if it be a malarious region at all, is quite certain to attack those engaged in the work, and even residents near by.

5. The malarial poison itself has an affinity for the soil, and the nearer we approach the ground the more virulent it is. For this reason people sleeping on or near the ground are more liable to be attacked, and people living in the upper stories of houses, or in houses a little above the level of the unhealthy district, are more free from it. Dampness and fog seem to concentrate the poison. Sunlight dispels it. But the greater liability to infection at night is chiefly from the subsidence of the wind, and the greater atmospheric moisture at that time.

6. The malarial poison can be transmitted by the wind to a distance from the place of origin. An instance is narrated where a vessel anchored over night, about two miles from shore, with a land breeze blowing, and all of the crew were attacked. Some say it can be carried as far as five miles. It will be noticed that some of the localities most severely affected in this State, as a part of Providence, were to the north of the supposed places of origin, the prevailing winds here being southerly. Trees, even in small numbers, tend to interfere with the spread of malaria. It is by this method of transportation that the disease appears at a distance from wet regions, and even at a considerable elevation on the sides of hills.

In conclusion it may be said: First, that we do not know the exact nature of the agent that produces malarial disease. Second, that we do know many facts in regard to its development and action. Third, that one of the most important factors in its production is moisture and decaying vegetable matter.

Recognizing these facts, it becomes the duty of physicians and all who have the public health at heart, to study carefully and conscientiously all the circumstances concerning the development of malarial disease in each particular locality. By so doing, means will often be found in one way or another, but most frequently by thorough drainage, to remove those conditions which favor the development of malaria. Proper drainage is a matter which, from an agricultural and purely economic view, is too little attended to in Rhode Island, and there are undoubtedly many places in the State where measures to secure drainage might be undertaken with great pecuniary advantage, to say nothing of the far more important result of greatly improving the health of the surrounding region.

PRENATAL EDUCATION.

BY

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SYNOPSIS OF SUBJECT.

Development of race dependent upon Heredity and Education.
Discussion of the two forms of Heredity.
Province of Congenital Heredity—fixation of types.
Province of Acquired Heredity—alteration of types.
Healthy Heredity in its several aspects.

Unhealthy Heredity—
    Disease and Deformities.
    Insanity and Idiocy.
    Crime and Pauperism.

Application of the Law of Acquired Heredity.
    Maternal influences.
    Province of Prenatal Education.
    Healthy Condition of Mother.
    Healthy Condition of both parents.
    Improper Marriages.
    Ill-assorted Marriages.
    Consanguineous Marriages.

Environment of Mother during Gestation.

PRENATAL EDUCATION.

In the introductory chapter to his work entitled *Hereditary Genius* Mr. Galton well says, "I conclude each generation has enormous power over the natural gifts of those that follow, and maintain that it is a duty we owe to humanity to investigate the range of that power, and to exercise it in a way that, without being unwise towards ourselves, shall be most advantageous to future inhabitants of the earth."

Racial improvement, or rather racial development, is the one great fundamental principle of civilization, the aim of the moralist and legislator, the problem of each successive age, the vital question which should concern every individual occupying never so lowly and obscure a position in society. Just as we reap the fruits of past ages, and suffer from the mistakes of older forms of civilization, just so surely will posterity be modified by the heirloom we give them, for better or for worse. Hence it must be sufficiently obvious, that the burden of progress rests upon present living generations; that the character of future civilization is determined by the tendency inherent in modern civilization; that the consideration of the best modes of present education and racial improvement obtains in every way to the advantage of those coming after.

THE LAW.

Heredity, which fixes and perpetuates the knowledge acquired through ages, and is a law which underlies all this racial development, is divisible into two factors, of equal importance, and mutually interdependent, namely, *congenital* and *acquired*. The first presents traits acquired in the ancestor, and prevents retrogression; the second assures further development. The one is congenital with ancestors, transmits qualities directly or indirectly to descendants, and is also congenital with descendants; the other is not congenital with ancestors, but only with descendants. It exhibits itself in those characters, psychological, moral and physical, which are due to the environment —

to the influence of habits, tastes, desires, disease, mode of life, climate, education, or any character acquired by ancestors during their lifetime from external sources, and transmitted to posterity. The best form of heredity is the one only influenced by education, and through which civilization is rendered capable of improvement. It is thus the faculties made susceptible of development are fixed in descendants; the progress of the race assured. It is this constant repetition of impressions, generation after generation, through persistent education, that old tendencies are fixed, modified or eradicated, and new predispositions created. Thus by drawing out the dormant, innate faculties by the proper means, we establish the tendency, at least, in posterity, of further improvement. And as at no other period of its existence the offspring is more susceptible of receiving impressions than through the sympathetic nervous system of the mother during gestation, the subject of *Pre-natal* Education becomes of deep interest to educators — a subject closely, and, I may say, indissolubly connected with Heredity. In fine it is a part of the law itself.

But, since congenital heredity concerns us so largely, in that it fixes and makes permanent in the offspring what has been acquired by the parent, it seems proper to consider briefly the subject of Heredity in its two forms already mentioned.

1. *Congenital Heredity.* No one, at this late day, will deny the existence of the law of heredity: it has been so well attested that we have no need in the present instance to waste time in its demonstration.

Congenital heredity manifests itself in two ways, either directly or indirectly. Characteristics and peculiarities of the most trivial sort may be transmitted from parent to child without a break, for generations; as instance the Austrian lip, a peculiar feature in the ruling family of Austria. Again, the inherited quality may be displayed only in every other generation; as in the case of some of the famous Greek athletes, where grandfather and grandson appeared to be the distinguished members of the family. Here every second generation was passed over, or it but slightly exhibited the hereditary traits. This form of heredity has been otherwise termed *heredity by alternate* generation.

Another form of congenital heredity is illustrated by cases of Reversion, as they are termed. Here a trait of ancestors two or more generations removed may reappear, not in the line of direct descent, but in a distant collateral branch of the family. Thus a grandnephew may show characteristics belonging only to a great-uncle; and the same thing may be seen in the case of the female members of the family. The other terms employed for the same principle, are *reversional* and *heterogeneous* heredity.

From this we can very readily perceive the enormous influence of heredity in moulding the character of future generations; and, under the best training, the liability of bad qualities cropping out, when, from the vast remove of the original source of evil, we should expect the reverse. In the same manner may be explained the exhibition of great genius, where the whole environment would seem to favor the contrary. Thus, too, may we account for a Nero, a Caligula, a Philip, Alva, and a Guiteau springing up, as it were, by the side of a Socrates, Plato, Aristides and a Garfield, and under seemingly like causes. And here it is that prenatal education comes into play, not only in benefiting the immediate, but the remote future—education being so thorough and scientific that all cases of sudden and horrible reversions will be crowded out, so to speak, and finally disappear—a better material having been produced, out of which to develope a better race of people.

Healthy, normal heredity, then, is to be especially desired. It not only betters and ennobles the individual, but transmits and perpetuates all the acquired nobility in the nation. To this active force is due each nation's peculiar physiognomy, character, tastes, habits, manners and customs, and whatever mental, moral and physical characteristics make it a distinct people. It explains the manner in which the nation is capable of improvement, and points out the way of escaping a reversion to its former savage, unhappy state. The character of the nation illustrates the character of the individual. England manifests in her present inhabitants the characteristics of her old Scandinavian and Germanic ancestors, the worshippers of Thor and Woden; the French exhibit the same peculiarity of temper, and psychological character as Caesar attributes to the Gauls, their ancestors; the modern Spartans are quarrelsome and fond of fighting, like their sires, who fought at Salamis and Thermopylæ; and the present inhabitants of Arcadia lead a pastoral like their fathers, and pasture their flocks as of old in the verdant valleys of Arcady. The peculiar features of the Chinese, and of the negro, are likewise due to inheritance. The phlegmatic Dutchman, the lethargic German, the nomadic Arab, the clannish Jew; all these, though differing so widely from each other, possess characteristics due to congenital heredity; each has congenital tastes and instincts which make them distinct peoples.*

The same fact is observed when we enter the province of comparative heredity. Among plants and the lower animals we note the operation of the same law. Different species and different varieties

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*Ribot. *Heredity*, pp. 108-119. Also *Caesar's Gal. Bell.*, *IV*, *5*.

are preserved and perpetuated through the influence of congenital heredity. Each species is known by certain fixed, permanent characters, which distinguish that species from all others. The same mode of leaving, budding, and fruiting in the parent plant we expect to see repeated in the descendant. From fleet horses we breed race horses; from keen-scented dogs, animals for the chase. Docile races will beget docile animals; the fierce bloodhound engenders in its offspring a taste for blood. We could not expect otherwise. Everywhere 'like produces like.' And this law breeders and gardeners have used in perpetuating new varieties, or improving the original stock.

2. *Acquired Heredity.* At the outset great difficulties stare us in the face. To this form of heredity must be attributed all the great varieties in form, tastes, and habits of race — the mental, physical, and moral characteristics of the individual. This is illustrated by the custom of breeders and gardeners when they desire to perpetuate new varieties accidentally acquired. In like manner may be satisfactorily explained (if we accept the theory of evolution) the defect or absence of certain organs, from disuse or otherwise, due to the environment. The organ from becoming less useful is less exercised, then becomes rudimental, or is done away with altogether; or there may be an improved development in faculties and organs which the environment demands.

From a survey of the above we can easily see in what direction our efforts may be turned, by way of acquired heredity, to racial development. It now remains for us to consider how far these innate physical and psychological characters may be directed, corrected and modified by education. We found that the power here rested chiefly upon the environment of the parent, and that this reacts again upon the child through maternal or parental influences. In other words, since the character of the offspring depends so much upon heredity of the congenital variety, the proper way to act upon the psychological habit of the child is through the fixation of such habit by heredity in the parent. The better the stock the better the breed.

Heredity acts thus by the accumulation of impressions constantly repeated, increasing the physical and intellectual habit in successive generations, securing by degrees a high state of intelligence in the individual, or rather creating the power of acquiring greater intelligence. But all this exhibition of intellectual character must be an outgrowth of psychological changes.*

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*Loc. cit , p. 320.

OPERATION OF THE LAW.

It has been observed above that education of every kind has to do with heredity which can only be acquired. Congenital heredity fixes and perpetuates whatever has been gained. After this point is reached personal efforts may cease, for all future development ceases; perfection has been secured, and is perpetuated; the nation has arrived at the acme of its civilization. But until that time comes, new tendencies must be acquired, improved and transmitted.

Physiological development, or changes in function, tissue and organ, may be transmitted by inheritance; in other words, physiological development gives rise to physiological heredity. To illustrate: By exercise a tissue receives more blood; it increases in size, power and function. In the same way the whole system acquires tone and vigor, and becomes capable of resisting and overcoming external influences. In all descendants produced from such organisms the same power of endurance is observed. Hence a strong, vigorous, healthy individual begets a corresponding healthy offspring.

Again, this physical health reacts upon the mental habit; and we obtain a 'sound mind in a sound body.' Psychological development is thus originated, which in time gives rise to psychological heridity.* This principle can be seen no more clearly than in normal and abnormal *acquired heredity*.

1. *Normal Acquired Heredity*. Physical development is well instanced in the case of the old Greek athletes, some families of whom seemed to carry off nearly all the rewards of victory. Several individuals of the same family exhibited this skill, such as father and son, two brothers, or grandfather and grandson, as being capable of winning in the various gymnastic festivals of Greece. Here the skill acquired by the ancestor was transmitted, directly or indirectly, to descendant.

Coming down to our own times, we find cases of celebrated oarsmen and wrestlers, who inherited their physical strength, and also transmitted it.† But yet, were these tendencies not in some degree acquired? None of their descendants could hope to acquire of themselves the power of prevailing over all competitors, unless the law of *spontaneity* may obtain, where geniuses seem to start up, not at all dependent upon any other law for their appearance. But in training those who have inherited certain tendencies, or predispositions for the athletic sports from ancestors, the results are more satisfactory than in those who have not inherited such tendencies. A case, however, is on record of a London clerk, who outstripped all competitors in a foot race, which took place among the Scotch Highlanders, although he had received no previous training whatsoever.* But we cannot go beyond a certain point in our physical training. After a certain limit has been reached, to transcend that limit would be dangerous, not to say fruitless, and a waste of time.

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*Loc. cit., p. 276.

†Galton's *Hereditary Genius*, pp. 305–315.

What has been said concerning the individual may be likewise applied to the nation. Its physical strength may be developed out of its individual parts. This fact is no better illustrated than by the ancient Spartans. By constant training, and the selection of the best physically constituted infants for rearing, the destruction of the sickly, feeble or deformed, and the training of the infant to live after a severe and ceaseless mode of discipline, Sparta had a hardy and invincible race of warriors. All nations, at their outset, seem to have adopted similar laws, but the Lacedemonians were preëminently physically perfect for generations.

Among the Jews we note a similar illustration of health and vigor, in their longevity, general freedom from disease and destructive plagues, and their great powers of reproduction under the most adverse circumstances. In Germany, it is estimated, a greater proportion of Jews live to their fifty-third year than do those among the Christian population.†

The psychological characteristics are so many and varied, that a few only must suffice; referring readers, for further enlightenment on this subject, to Galton's great work, and to other treatises on heredity.

Whether in regard to statesmen, judges, barristers, warriors, musicians, artists, scientists, literary men, or others, the same law is in operation. We find talents in special directions to run in certain families, and attain to greater excellence in later generations. Mozart is one instance among musicians. His father was a famous violinist, and his sister an excellent performer on the piano. But, perhaps the best example we have of hereditary musical ability is found in the Bach family. This talent extended through eight generations, first appearing in 1550, culminating in Sebastian, the great composer, in 1750, and ending in 1800, with a female descendant, a respectable musician. This family comprised more than twenty eminent individuals; one originated the present piano forte music. It is a curious fact that all the musical genius of this remarkable family was transmitted only through the male line.‡

Linnaeus had a son who was an eminent botanist; Darwin, the famous author of the theory of *Natural Selection,* had a distinguished ancestry. Among jurists, commanders, statesmen, poets and artists we note like cases of heredity.*

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*Loc. cit., pp. 14–15.

†Ribot, Loc. cit., p. 113.

‡Galton, Loc. cit., vid. Musicians, etc.

Moral characteristics may likewise be acquired and inherited. Instances are abundant of the religious element predominating in certain families, giving rise to loveliness of character, or breaking out in all the glaring colors of bigotry, fanaticism and asceticism.

A nation may exhibit a similar moral habit, as the Jew, and other Shemitic peoples, in whom the religious or moral element predominates over every other feeling; their body politic being made up entirely of moral and religious precepts.

National psychological character is due to like causes; the individual determining the character of the race.

Individual peculiarities of mind and body, in education, and in those characters which do not conflict with health and normal mental habit, fall under the same law. These are of too common occurrence to need further consideration.

2. *Abnormal Acquired Heredity.* This form of heredity shows itself in the mental, physical and moral aspects like the last.

Physical anomalies comprise those cases of diseased function acquired by parents and ancestors, and transmitted in a greater or less degree to descendants. Especially is this the case with women during gestation, through what have been termed *maternal influences;* that is, peculiar qualities, tendencies, or predispositions transmitted to the unborn child through external impressions upon the mind of the mother. Under this head may be included diseases, or the tendencies to such diseases, which are hereditary, and those predispositions to certain impressions variously termed idiosyncrasies, diatheses, and inheritable tendencies. A vulgar interpretation of the same principle is the old *humor* theory, now fast losing its hold with the advance of science and common sense.

In the same class may be placed anomalies of tissue or conformation, such as monstrosities, malformations and various physical infirmities; such as double-headed and acephalous monsters, which are never perpetuated through the operation of congenital heredity; multiplicity of organs, like sexdigitism of the Colburn family, and of others known to the writer; defects and malposition of organs, and the like. The Ancon variety of sheep, with its crooked legs, which seemed to every appearance a freak of nature (*lusus naturae*), was turned to advantage by sheep breeders, so that this breed of sheep has been made permanent; the malformation becoming at length transmitted by inheritance, with no fears of reversion.

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*Ribot, Loc. cit.

All these physical anomalies, unless new and constantly increased artificial means are used for perpetuating them, have a tendency to die out. This was the case of the Ancon variety of sheep. The breed was perpetuated only by adapting the new individuals to the change of environment. Had this not been done the variety had perished long ago. Tall men, and six-fingered and six-toed individuals, if properly selected and mated, might in time give rise to tall men with an unusual supply of fingers and toes; and this through the operation of the law antagonistic to *acquired* heredity, known as *congenital* heredity. This fixes all physical changes against, as well as in harmony with racial development.

The same view may be entertained here in regard to nationalities. To illustrate this let us take for example the inhabitants of the northern side of the Pyrenees, a debased people known generally under the name of *Cagots*. They are shunned as though they were lepers. They are characterized by the smallness of the lobe of the ear, and fishy eyes. They also have an extremely fetid breath, live by themselves away from the neighborhood of villages, and are regarded with universal abhorrence. They form a wretched class of people, and transmit their defects to their descendants to this day. Yet, in spite of this, it is said, they are industrious, somewhat intelligent, and good mechanics.*

The Gypsies offer another example of physical and mental debasement, unsusceptibility to moral improvement, due to heredity, and the unchangeableness of the environment. The character of the individual elements of both these people must be obvious to all.

In considering the subject of mental and physical decay, we must start with this postulate, that *mental power is dependent upon physical development.* The stronger the constitution, and the sounder the organs, the better the work of the mind. On the other hand, the weaker the constitution and the more enfeebled the functions, the more susceptible the mind to disease. Thus an enfeebled body is less capable of resisting mental strain; when the mind gives way, and becomes likewise diseased through the sympathetic system of nerves; and this again becomes hereditary.

Thus epilepsy, which has been induced in the ancestor during life from some morbid changes in the spinal cord, may give rise to epilepsy or insanity in the offspring. The same may be said of acquired hysteria, chorea, idiocy and hypochondria. Each of these diseased states may again be the inheritance from an ancestor subject to insanity.

We now come to the consideration of a wide and much vexed question, namely, the responsibility of those persons who commit criminal acts when laboring under some form of insanity. And it becomes the more important to us, since many forms of insanity appear to be latent in ancestors, and are developed in descendants after a sufficient lapse of time; or the insane impulse may show itself at about the same age at which it was first observed in the ancestor. These inherited tendencies to mental disease constitute a subject well to be noted in the education and treatment of children possessing, or supposed to possess, insane ancestors; and if the offspring of such parents be subjected to the proper constraint and discipline, the disease may be retarded or entirely prevented from appearing, and probably from becoming hereditary.

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*Ribot, Loc. cit., pp. 117-119.

Cretinism illustrates the subject on the national side of the question. Here idiocy, as well as physical infirmities, is a part of the national character. Healthy women, if they pass the period of gestation in infected districts, give birth to Cretin children. Children thus born of healthy parents are no more free from the disease than those of parents partially or wholly diseased. On a change of the environment the mental and physical defects of the child are greatly improved, if not wholly eradicated. This disease is fortunately confined to certain districts of the Alpine valleys. Elsewhere the affection is not observed, if we except the deformity known as goitre, or Derbyshire neck.*

The last aspect in which we shall consider abnormal acquired heredity, will be the perversion of the moral nature. Gluttony, avarice, cannibalism, inordinate lust, showing itself in rape and unnatural crimes, depraved appetites of all kinds, and the tendency to commit robbery and murder, to become paupers, or to lead a vagabond life, have all been placed under the head of depraved moral heredity.†

The best treatise we have at present on the hereditary nature of crime is by Mr. Dugdale, in his little work on the *Jukes.* In it the history is given, more or less complete, of twelve hundred individuals, of criminal tendencies, all the descendants of one abandoned woman who has generally been known as 'Margaret the mother of criminals.' Hardly a single member of this family led an upright, honest life. Their whole environment favored immorality; and their native place, in the interior of New York State, might be characterized as a nest of crime. Tracing the history of this large family down for seventy-five years, Mr. Dugdale finds that, in crimes and misdemeanors of every kind it has cost the State of New York, in one way and another, over a million dollars. From father to son is almost one unbroken line of crime, perpetuated and intensified by environment and close

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*Encyclopedia Britannica, 9 ed., art. *Cretinism.* Chamber's Edinburgh Jour., May, 1848, pp. 296-99.

†Ribot. Loc. cit., Part I., cap. VI.

intermarriage, or rather by illicit relations of near kindred; for scarcely a legal marriage was known.* Thus bad blood produced bad blood. Not one had strong enough will to overcome the environment, and acquired heredity, which in time became fixed and congenital, with no hope of improvement.

Space is left us for the consideration of only one other instance of depraved heredity, namely, pauperism, and its near relative, vagabondism. It is but recently that the subject has been viewed in the light of inheritance by transmission. But when we find two, three, and even four generations of paupers the inmates at one and (except in the case of the latter) the same time of a poor-house or work-house, and born and bred there, we cannot be blind to the operation of a law, or principle, governing the lives of such persons, and rendering it impossible for them to overcome hereditary character.

The pleasures of a vagabond life, so to speak, especially when some benevolent institution throws open its doors to vagabonds, where they may end the last few years of their lives in comparative comfort, are too great a temptation to those whose intellect is weak, and energies incapable of engaging successfully in the struggle for existence. Having asylums ready for their reception when they wish to seek them, the tendency to pauperism and vagabondism is increased rather than diminished. So long as a comfortable home is assured, little or no work required, so long will there be paupers and vagabonds to fill them. An asylum is a paradise to those to whom 'the world owes a living.' The worthy, exceptional poor, are thus driven effectually from those very institutions which were built for them alone, so that this class is seldom or never reached. Foundling asylums come under the same discredit. They seem to encourage immorality rather than limit the number of illegitimate and abandoned children.

Reports of charitable institutions show that these views are but too well founded. Thus there were 707,375 paupers in England and Wales, according to a report for July 1, 1876, at a cost to the government of over seven and a third million pounds sterling. There were over 40,000 pauper children which attended work-house and pauper schools. Of these, 15,568 lived in the work-house, subjected to all the bad influences of such training; 8,000 others attended district schools, or were boarded out in cottage homes. Only one-fifth, therefore, of the whole number of children enjoyed a pure atmosphere, and untainted by poor-house associations. Those who have studied this subject, and are best fitted to judge, consider that the pauper taint, when once imbibed, is never completely eradicated; that those brought up in the work-houses lose after a while all horror of the place, and are "always lamentably deficient in that spirit of inde-

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*Dugdale. *The Jukes.*

pendence which is the greatest stimulus to exertion, and that nothing more degrades the character, in every way, than the pauper sentiment and temperament which the work-house induces."

In Scotland pauperism has been somewhat checked by what is known as the boarding-out plan. The expense has decreased from £2 to £4 *per capita*, with only five per cent. of failures, or relapses.

In France, under the village plan, there were only four per cent. of relapses to the previous 49 per cent. The paupers were boys who had committed crimes. Under this system (1877) 4,500 boys were educated. Of these, 850 were children of criminals; 1,400 illegitimate; 580 children of second marriages, and 850 orphans. Half of them followed the honest calling of agriculturists; one fourth became mechanics; and the remainder (less those who relapsed, four per cent.) entered the army and navy.*

Germany has also become alive to the necessity of adopting some effectual remedy to prevent pauperism, and is still struggling with the problem.

Coming to our own country, we find a like deplorable state of affairs. Professor Dwight is said to have remarked, "One of the most terrible diseases which can affect a country has begun to break out in the rural districts, through the influence of the poor-house," alluding to hereditary pauperism. In the report of the Secretary of the State of New York Charities, it was said, that in the western part of that State were found *four generations* of paupers, all women of an immoral character, and *confirmed* paupers.

At the Dexter Asylum, Providence, R. I., is still to be seen the only surviving member of a family of three generations of paupers. They were among the first inmates of that institution, and were removed thither from the old work-house on August 11, 1828. Sybil Pitts, the grandmother, was 60 years of age at the time, was of immoral character, never legally married, and died there seven years later. Sally, the daughter, was a woman of weak intellect, immoral, never legally married, and died in 1864, at the age of 72. Benjamin, the son of the latter, was admitted when he was but 16, was never married, is an imbecile, and has now reached his 70th year. This family, so far as known, were always paupers, and always members of the work-house. The last named individual has already passed at least fifty-four (54) years of his life at public institutions. Other cases are given in Mr. Hazard's book, where individuals have been born (in Rhode Island) in a work-house, and lived there as long as sixty-eight (68) years. Generally such persons are children of intemperate, immoral or weak-minded parents, or intemperate and of unsound mind themselves.

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* *Contem. Rev.*, *Vol.* XXI., pp. 133 et seq. *Hereditary Pauperism, etc.*

One other instance at the Dexter Asylum deserves mention. Here but two generations are represented, both on the female side. The mother is married legally, but epileptic; the daughter is sixteen, healthy, but not of strong mind, and cannot be trusted away from the asylum.

The foundlings brought to this institution are about nine out of ten of *the illegitimate class.**

APPLICATION OF THE LAW.

Now how are we to develope predispositions, improve the race by means of this law of acquired heredity? And how, again, shall we be able to remedy the bad effects in psychological and physical habits? How are we to eradicate all inherited taint, in training children of mentally, morally, or physically diseased ancestors?

Acquired heredity depends upon a principle, or force, known as the 'Law of Adaptation'—the influence of the surrounding circumstances upon the individual—adaptation to the environment. This law must never be lost sight of when considering the subject of education; and he who applies this law in its fullest understanding must always be regarded as the best educator. Thus ever exercising its influence upon the individual in many directions, education must after a time fix and make permanent certain qualities, tendencies, or predispositions, which are inheritable. This, of course, developes the race. Transmission by inheritance will then become congenital, the desired object in education. If this training be of the proper kind, the congenital heredity will take the proper direction.

Now congenital heredity preserves the normal type of the race, or of the individual. It is a much stronger force than the acquired form of heredity, as it should be, else every monstrosity and malformation would be lamentably and irremediably perpetuated. There is thus a constant struggle between these two forces; and it is only by constant repetitions of training, a persistent effort in one direction, that at last the acquired tendency wins the day, becomes congenital, at the same time not preventing the normal type from declaring itself.

Hence it may be seen, that acquired heredity is a *radical* force, while the congenital form of it is *conservative*. Did the former be suffered to have complete control over the organism, there would be no end to monstrosities and novel productions; the normal type would disappear, in short be its own destroyer. Experiments in crossing, and close inter-breeding of plants and animals show this.

On the other hand, did congenital heredity be allowed to have full control, the race would remain stationary. There would be no prog-

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*For further information on this subject see Mr. Hazard's *Reports* (1851) *on the Poor and Insane of Rhode Island.*

ress, and the race would be where it started — a race of savages or semi-apes. It is therefore by a just balance of these two allied forces, through the law of adaptation, that the progress of the race is assured.

Now what form of education seems best adapted to the attainment of this end? What tends especially to the creation of tendencies to improvement, or the development of race? I answer, *prenatal* education, or the influences exerted over the unborn child by the mother during gestation.

The subject of *prenatal education* was first broached by Mr. A. De Frarière, in 1862, in a work entitled *Education Anterieure,* comprising the "Maternal influences during gestation, over the intellectual and moral character of the child." As this title refers to education *anterior* to birth, I have ventured to use the term *prenatal* in preference to anterior, as being more comprehensive.

It is admitted on all sides that the mind influences the body through the system of nerves known as the Sympathetic. Fear, anger, emotions of every kind, leave their impress upon the individual in some form. Fear has been known to pervert the secretions, produce intestinal derangement, and blanch the hair. Fear, also, and the power of the imagination, have occasioned death; the remembrance of a disgusting or loathsome object has been so strong as to cause nausea and even vomiting. Fear has sometimes cured as well as caused disease.

The influence of the maternal mind over the unborn child may, perhaps, be better understood if we first briefly discuss the alteration of the secretion of the milk through emotional disturbances in the nurse, or the mother. Thus a mother, or a nurse, if suffering under some overwhelming emotion, may be the innocent cause of the death of the child.* Boerhaave has mentioned the case of an angry nurse as the cause of epilepsy in a child she suckled; Brachet of a child thrown in convulsions on taking the milk of a nurse hardly recovered from a fit of anger against another woman. Bouchut declares that, when a mother labors under any violent emotion, the infant she nurses becomes agitated, ill at ease, and may have convulsions.† Any great excitement in the mother or the nurse, may so change the composition of the milk as to make it more or less pernicious to the child.

1. The maternal influence begins with conception, and extends through gestation and the period, known as lactation, which we have just considered. The unborn child is influenced more or less by what influences the mother, through the sympathetic nerves above mentioned; and this fact will be the more appreciated, when it is consid-

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*[The Influence of the Maternal Mind over the Offspring during Pregnancy and Lactation.](#) Journ. of Psychology, Med. Vol. 2, pp. 1 et seq. Carpenter's *Physiology*, arts. Secretion and Generation.

†Journal of Psychology, Med., loc. cit.

ered the child is part of the mother herself, supported and influenced by her. Whatever disturbs the mother, must, in some degree, affect the child. Thus if fathers bequeath to their offspring a taste for drink, or crime, what must be the influence of an intemperate mother over her offspring in the most intimate relations as it is with her? Thus women addicted to intemperate habits may, by means of her circulation, destroy their offspring whose system cannot withstand the alcoholic poison; or she may bear a child of feeble mind and body, or never a living one.

Disease may be acquired also by the fœtus during gestation, through the mother, as in the case of small pox. The child may take this disease while the mother escape, though she may have been previously vaccinated; or the child may die of the disease before birth, while the mother entirely escapes. Syphilis, when contracted in whatever way, just previous to, or during gestation, may be transmitted to the offspring, affecting it permanently, or causing its death; or what is worse, rendering the bearing of living children utterly hopeless.*

Women exposed to lead poisoning are liable to miscarry. "Out of 123 pregnancies recorded, there were 64 miscarriages, 4 premature labors, 5 still-born children, 20 which died within the first year, 8 in the second, 7 in the third, and one at a later period; 14 living, of whom 10 only were more than three years old."†

2. The influence of the maternal mind over the unborn child offers us a deeper and more difficult problem; and M. De Frarière sees in it a fruitful source of improving the race, shaping the intellectual and moral character of offspring, and creating in them, anterior to birth, tendencies, impulses, or predispositions (as he calls them) for excelling in special lines of business or professions.

The doctrine of prenatal education has had more or less able advocates from ancient times down. The cunning Jacob is thought to have had some knowledge of this subject when he outwitted Laban, his father-in-law, and bred herds of such markings that the majority of them fell to his lot. Some such influence as this has been thought to be at work upon the fœtus, when the mother, during the earlier months of gestation, is affected by certain external impressions or disturbances. Many absurd stories, therefore, have received currency, at one time and another, on the authority of such doctrine, such as marks of fruits, etc., known as "mother's marks," occasioned by shocks, emotions and ungratified longings in the mother, But, says Dr. Carpenter, "No soundly judging physiologist of the present day is likely to fall into the popular error of supposing that marks upon

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*Cazeaux, *Midwifery*, 5th Am. ed., p. 447.

†Loc. cit., p. 453.

the infant are to be referred to some transient though strong impression upon the imagination of the mother; but there appears to be a sufficient number of facts on record to prove that *habitual* mental conditions on the part of the mother *may* have influence enough at an early period of gestation to produce evident bodily deformity, or peculiar tendencies of the mind."*

Other authorities are fully alive to the importance of a correct understanding of this mysterious influence, and give examples more or less conclusive.†

Our subject may be further illustrated from the inferior animals. The mother may be so impressed with the attributes of the father as to transmit them to her offspring, as in the following instance: A mare had a foal by a quagga, and, then, subsequently gave birth to four colts, each of which was marked along the spine with a stripe like that of the quagga. We often see litters of rabbits, dogs, and sows with markings like those of previous litters with different fathers; and it is not uncommon to see the children of a woman (widow) by a second husband, resemble in body and mind her first husband; provided, of course, she has had children by her former husband. Breeders of stock are also aware of this fact, and never let blood animals run with males of an inferior stock. So strong, in fine, is this influence of the father upon the mother through his children, that the wife often comes to resemble her husband in mental and physical characteristics.‡

This maternal influence not only affects the bodily configuration of the child, but its mentality. Dr. Seguin has given cases where there was reason to believe that idiocy in the child has been due to a fright, anxiety, or any emotion in the mother.§

It remains now to consider how this sensitive organization of the child may be influenced in more or less special lines, through prenatal education, to the improvement of the race, and the happiness and further development of the individual.

M. De Frarière seems to be an enthusiast on this subject. He gives every prominence to anterior education, and would give a thorough course of special training to the enciente mother, in that direction according to the *predisposition* desired to be produced in the offspring. He cites music as an acknowledged created predisposition, and as an example makes mention of a youthful prodigy astonishing the musical world with his marvellous talents (1862); and this gift of music was acquired (sic) by giving his mother a thorough course of musical instruction during her gestation.‖

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*Carpenter's Loc. cit. Article *Generation.*

†Journal of Psychological Medicine, etc., vol. 2, p 1 et seq.

‡Loc. cit., p. 21.

§Loc. cit., p. 23.

Loc. cit., vol. 2, p, 322 et seq.

Though much of the theory of De Frariere smacks of the visionary and impractical character of French theorists, yet he undoubtedly proves that the character of the child is affected by the mental and physical training of the enciente mother; and though we may not hope to manufacture musicians, scientists, and geniuses generally, to order, we may yet be able to remedy defects in the race, improve existing faculties, create a tendency to improvement, or, as he would say, a *predisposition.*

Our author strengthens his theory by taking examples of breeding among the lower animals. The Arabs, he remarks, entertain the firm belief that the mare influences her foal. She is therefore well cared for during gestation; for they think that *race* will not be sufficient of *itself* to endow a foal with those qualities of speed so highly prized. Dogs and cats also produce offspring of a gentle disposition if not irritated in pregnancy.*

The ancient Mexicans seemed to be aware of the same fact. During her gestation the woman was required to observe many rules to insure the safety and perfect development of her future offspring. Hard and continued labor, lifting of weights, running, and all mental excitement, such as fear, anger, grief, and the like, were particularly to be avoided. But like the more civilized nations of the Eastern Hemisphere, the Aztecs gratified, with but one exception, every caprice of the pregnant woman, for fear that the least disregard of her whims might be attended, in respect to the child, with the most unhappy results. Many of these precepts, however, were of a superstitious nature, but not more so than are found among all peoples in early and rude civilizations.†

Among the ancients, the Greeks more especially felt the importance of a perfect knowledge of this principle. They trained their youth of both sexes with the avowed purpose of making healthy men and healthy women, and rearing a hardy race of warriors. As the story goes, a Lacedemonian woman being told that the Spartan women ruled the men, very truly replied, "We are the only women who bring forth men." And this simple legend more than volumes shows the object of Spartan legislation. Inured to hardships alike with the men, and the severest discipline of the gymnasiums, which abounded in all Greece, the women surpassed all nations not only in physical beauty, but in the treasures of the mind. And so equally were mental and physical training balanced, that a sound mind could be said to exist in a sound body.

The object of all this training, then, being the production of a strong, healthy, vigorous race, the education of the young Greek began before birth. To this end women during gestation were subjected to moderate exercise, required to undergo a course of hygienics, allowed no wine unless diluted with water, while their diet was regulated by the physicians. In fine, they must lead a tranquil life. Lycurgus somewhat modified these rules by requiring of the women a severer form of exercise, so as to benefit both mother and child,* and also, undoubtedly, for the special purpose of rendering childbirth less painful.

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*Loc. cit.

†Bancroft's *Native Races, etc.*, vol. ii., p. 267.

From the foregoing facts we can not fail to see that the Greeks perfectly understood the importance of physical and mental culture, not only in benefiting the mother, but, to some extent, in moulding the character of the child — the necessity of treating the mother with more kindness and indulgence at that period of her trial, when leniency is particularly grateful to her, and tends so much to the proper development of her offspring. For children conceived in sorrow, misery, poverty, and a host of other untoward circumstances which might be in the majority of cases greatly modified or obviated, inherit all the bad qualities of ancestors, with few if any redeeming characteristics. Such an environment seems to revive latent characters, the survivals of savagism.

A preparative, so to speak, to prenatal education, is the proper education of the parents. As the male influence, as well as the female's, affects the offspring (in transmitting qualities unpossessed by the female line), so the education of both parents is important if we expect to secure satisfactory results. The Greeks saw this clearly, perhaps more clearly than any other people, and used it for their purpose. If we, then, model the education of our youth after Spartan methods, we at least secure healthy men and healthy women at the outset, and not feeble bodied, weak minded individuals whom no law forbids to propagate paupers, criminals, and imbeciles. We first want good material to begin on.

Among those practices particularly to be avoided in attaining this end are:

1. *Intermarriage of the Diseased.* This refers to any who may be diseased mentally, physically, or morally — one, or both the parties contracting marriage. Whether the disease be latent in the system, or already has appeared in one or both parties, the fruit of such marriage will as surely partake more or less of the defects in the parents, as a piece of charcoal will leave its impress upon the fingers. Children of drunken fathers, or mothers, or, worse still, with both parents of intemperate habits, are usually feeble minded, inherit a passion for

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*Aristotle. *Politics*, IV. 17.

drink, or die early. Charles X. had an intemperate father, and died of general paralysis. Many diseases are found inheritable, even latent in one generation, and breaking out in a second; or else transmitted for several generations to the misery of the infected. Truly the sins of the fathers are visited upon the children of the third and the fourth generation.

2. *Improper Marriages.* These comprise the marriage between persons too young, or too old, or where there is great disparity in age. The character of modern society makes such unions too common, especially as few men among the better classes can acquire sufficient means to marry until late in life. The old and the young were never intended to be mated. Some enter the married state almost as soon as they catch a glimpse of the world, united to some aged millionaire. Neither is it desirable for babes and sucklings, hardly out of the cradle, to marry; nor those with but a few years between them and the grave, unless a first marriage, and only then with a woman of a suitable age. Sparta had laws against such unions. A young man and a young woman were obliged to marry before a certain time under the penalty of losing special privileges. He who did not marry till advanced in years was looked upon as little short of a criminal. It is needless to say that the offspring of all these improper unions possess qualities incapable of meeting successfully the struggle for existence.*

3. *Ill-Assorted Marriages.* Men of intellectual ability should stamp the character of the race. But unfortunately the contracting parties are not always equal in mental and physical culture. A passing fancy, or the dictates of society, generally overturns all laws with regard to health and proper marriages. Many a fine intellect has been dwarfed by an ill-assorted marriage, and the children have generally inherited the worst qualities. But probably people will continue to marry to suit themselves, for money, or otherwise; and it is wonderful the race is even so well preserved. Such marriages are ill-advised, and generally prove a fertile source of unhappiness.†

4. *Intermarriage of near Relatives.* Concerning consanguineous marriages much has been said, and as much more might be as readily written without exhausting one tithe of this interminable question.

With rare exceptions the history of the past speaks against such marriages. The laws of Manu, Moses, and of the Romans, the decrees of the Christian Councils, and the Koran are against them. Some savage people were in favor of them; and others not.

Scientists, including Darwin, observing the bad effects of close inter-breeding among the lower animals, would discourage the mar-

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*Walker's *Intermarriage*, part VII., pp. 334-5. †Loc. cit., p. 163.

riage of near relatives. In animals such inter-breeding is followed, with but few exceptions, by loss of vigor and fertility. The exceptions, however, do but prove the rule.*

Many attribute to such unions all the ills humanity suffers from, such as idiocy, deaf-mutism, epilepsy, mental and physical decay. To prove this last Ribot cites the families of the *Largidae* and *Seleucidae.* The first family dates from the reign of Ptolemy Soter to Cleopatra and Cæsarion, covering a period of nearly 300 years, and producing sixteen sovereigns. The other family reigned for nearly 250 years, and possessed twenty sovereigns. Both were in a state of decay. Sisters often married brothers; nieces, uncles; and aunts, nephews. Both families also intermarried, thus perpetuating all the *acquired diseases and evil habits of past generations.* The two families finally became extinct.†

On the other hand, Quatrefage has observed that, when both parents are healthy, consanguinity will have a tendency to perpetuate such health, rather than result disastrously to the family thus marrying. But, as this establishment of perfect equilibrium of the health of the parents is easily disturbed, he regards such marriages as injurious in proportion as the morbid predispositions, common to both, are more marked. Ribot, quoting the above at large, would not advocate them, on account of their usual results; though they are not necessarily hurtful in themselves‡

The ill effects of the intermarriage of near relatives may be again seen in the history of the aristocratic classes, the old nobility, and others, where caste, policy, diplomacy, money considerations, and various family reasons, tend to perpetuate such unions. Different from most monarchical countries, England is an exception to the general tendency. Here the nobility never remains stationary, being recruited from time to time from the mass of the population. Men knighted for services rendered the State, or ennobled for great merit, renovate the decaying energies of the aristocracy, not only bringing into it better blood, but constituting it one of the ablest and most vigorous classes of people in existence. Money, here, for once is of service, being an inducement for alliances with noble families, either on the male or the female side.§

Similar bad results are still further noticed in islands or in small communities remote from public travel. After several generations the evil effects of consanguineous marriages are apparent in physical and mental infirmities, loss of character and energy, and in an increase of scrofula and consumption. No improvement is seen in the people

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*Darwin's *Animals and Plants, etc.*, vol. ii., c. xviii.

†Ribot, Loc. cit., pp. 290-292.

‡Loc. cit., p. 293.

§Vid. Smiles' *Self Help.* Walker's *Intermarriage*, part iv., pp. 71 et seq; part vii., pp. 312 et seq.

Sooner or later decay of body and of mind is manifest. Certain inhabitants of the valleys of Switzerland show this clearly. Impassable mountains encompass them on every side, shutting them out from intercourse with the outer world. And there have they lived for hundreds of years, and closely intermarried. "Here we find goitre, cretinism, scrofula, albinism, mutism, and idiocy, in all their most aggravated forms."*

To the same cause, especially, has *sterility* been attributed. In 123 cases of consanguineous marriages, given by Dr. Allen, only 99 were fertile.† But their bad effects are no better proved than by the disappearance of all mental and physical defects when marriages take place between more remote relatives.

Even the intermarriage of first cousins is not unattended with risk. In a report of 580 cases of such unions, resulting in 2,778 children, "793 of the children were defective; 117 deaf and dumb; 63 blind; 231 idiotic; 24 insane; 44 epileptic; 189 scrofulous; 53 deformed; and 637 died early.‡

"But inasmuch," says Dr. Allen, "as there is in cousins, according to the best statistics gathered, so much of a family resemblance or likeness, and so much imperfection of structure or morbidness of function or eccentricity of character is found to accompany it, that the hereditary effects are decidedly prejudicial to offspring, we are warranted in laying it down as a general rule, *that cousins should not intermarry*. This rule is the more imperative when it is considered that the evil effects accumulate with wonderful power in every successive generations, and that there is no absolute necessity for the formation of such marriages. As *free moral agents and accountable beings, then, we have no right to inflict upon the innocent such an untold amount of misery and suffering.*"§

The question concerning the future of hybrid peoples, formed by the union of superior with inferior races, is still unsettled, but, at least, so far as our experience goes, the tendency is bad. The prospect looks dark even for the inferior race.

Such, then, are some of the most salient points well to be considered in attempting the material improvement of the race. Whether prenatal education is destined to secure all the wonderful results which the enthusiastic De Frarière would claim for it, is a question which is not possible to be answered in the present infancy of the subject. But it is undoubtedly true from the authentic cases recorded, where many untoward results have followed inattention to such matters; where shocks, and mental disturbances of all kinds which would produce no bad effects upon the mother, might, however, be the cause of death of the child, or, what is a hundred times worse, idiocy, or deformity, that careful attention to the mother's environment during gestation is attended by the best results.

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*Journ. of Psychological Medicine, vol. iii., pp. 247 et seq.

†Loc. cit., pp. 256 et seq.

‡Loc. cit., p. 256 et seq.

§Loc. cit, p. 293. Also on the subject of Marriage, Inter-breeding, and the Transmission of Disease for further reference, see Darwin's *Origin of Species*, and *Descent of Man*, Wallace's *Natural Selection*, Maudsley's *Physiology and Pathology of the Mind*, and Carpenter's *Mental Physiology*, article *Hereditary Transmission*.

From such cases of a negative type, we are the more fitted to judge in some degree of the importance of obeying the laws of nature, and using to the advantage of the race the two forms of heredity, *acquired* and *congenital.* What is true in respect to the lower forms of life, is likewise true in regard to man.

It is clearly evident, therefore, that it should be our constant endeavor to ameliorate as far as possible the condition of the mother during her trying period, and to surround her with those influences which, though not at once producing in her child qualities unpossessed by ancestors, may at least place her in the best possible condition for creating in her offspring tendencies to improvement, which further education, after birth, may develope in the desired direction.

To sum up the general arguments employed in the foregoing pages, we arrive at the following conclusions:

That the improvement of the race depends upon the character of the *environment.*

That external circumstances react upon the individual through what is known as *heredity,* or transmission of qualities by inheritance.

That heredity is a law everywhere in operation, and shows itself under two forms, namely, *congenital* and *acquired*; the first fixing the character of the individual, and afterward the whole race—preserving and perpetuating the normal type of each individual and the nation; the other producing new varieties, or types, dependent upon the environment, but modified by congenital heredity.

That morbid heredity is obviated by the congenital, and assisted by the acquired form, if operating in the right direction.

That the persistent action of acquired heredity finally gives rise to the congenital form of inheritance; that is, makes the acquired character perpetual.

That in this way education, or the proper application of the environment, tends to racial development.*

That education may be of two kinds, namely, before birth (prenatal), and after birth.

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*The term *Education* must not be confounded with the word *Instruction;* it rather signifies to *draw out*, to *develope*, not to *put in*.

That maternal influences exercise control over the unborn child from their close relation with heredity.

That a perfect understanding of the laws of heredity leads to the proper kind of prenatal education to be adopted.

That previous education of both parents, especially of the mother, makes the prenatal education more easily moulded to hereditary tendencies.

That a careful attention to mother during gestation is followed by the most happy results.

That the creation of tendencies, or predispositions, is all that in the present state of science can be expected.

HOUSE DRAINAGE

AND

SANITARY PLUMBING.

BY

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The State Board of Health and the writer desire to express their sincere thanks to the following gentlemen, who kindly loaned electrotypes for this report:

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HOUSE DRAINAGE AND SANITARY PLUMBING.

Many erroneous ideas still prevail about sewer gas and its danger to health which arises, by having so-called "modern conveniences" in our dwellings. It is the purpose of this paper, without in any way adding to the "plumbing scare", clearly to define wherein the danger consists, but at the same time to establish rules for the proper drainage and plumbing of houses, which, if carefully observed, will secure to the anxious house owner, work of superior quality and of a positively safe character.

Plumbing fixtures, which were considered a luxury years ago, are now believed to be necessary, not only for comfort and convenience, but also, and even more so, for health and for cleanliness. Even a small house is nowadays generally provided with a kitchen sink, a water-closet, and sometimes a bath-tub, while in a costly modern residence, arranged with an elaborate system of plumbing, we find kitchen, pantry and scullery sinks, slop sinks, laundry tubs, stationary wash-basins in closets near bed-rooms, a great number of bath or dressing rooms, with water-closets, urinals, bath- and foot-tubs, bidets and other fixtures.

The suggestions and recommendations of this report apply with equal force to the drainage and plumbing of tenements, small houses, costly residences, villas, apartment houses, hotels, factories, schoolhouses or public buildings. As every plumbing fixture is not only an outlet for the waste-water to the drain, but possibly may become an inlet for drain air, the danger increases with the number of fixtures. It is, therefore, of the utmost importance to arrange the plumbing and drainage of a building so as entirely to exclude any possibility of the escape of sewer gas into it.

I shall, first, briefly consider what is meant by the term "sewer gas." This term, as Prof. W. Ripley Nichols has truly said,* is "an unfortunate one, and gives rise to a quite widespread but very erroneous idea. Many seem to suppose the "sewer gas" to be a distinct gaseous substance, which is possessed of marked distinguishing characteristics, which fills the ordinary sewers and connecting drains, and which, as a tangible something, finds its way through any opening made by chance or by intention, and then, and only then, mixes with the atmospheric air."

Sewer gas is a mechanical mixture of a number of well-known gases, having their origin in the decomposition of animal or vegetable matter, with atmospheric air. This mixture is continually varying, according to the more or less advanced stage of putrefaction of the foul matters, which form a sediment and a slimy coating of the inner surfaces in drains and pipes. It is also variable with the character of this sediment or deposit, and with the physical conditions (moisture, heat, etc.) under which the decomposition takes place.

The principal gases found in sewers and drains are oxygen, nitrogen, carbonic dioxide, carbonic oxide, ammonia, carbonate of ammonia, sulphide of ammonium, sulphuretted hydrogen and marsh gas.

The three first named gases are the principal constituents of the atmosphere, surrounding the globe, and are found present in the following *average* proportion, viz.:

$$\left.\begin{array}{l}\text{20.9 vols. oxygen}\\ \text{79.1 vols. nitrogen}\end{array}\right\}\text{in 100 vols. of air, together with}$$

2 to 5 vols. carbonic dioxide in 10,000 vols of air.

According to R. Angus Smith the amount of *oxygen* is:

in the average, 20.96 vols. in 100 vols. of air.
in pure mountain air, 20.98 vols. in 100 vols. of air.
at the sea shore, 20.999 vols. in 100 vols. of air.
in streets of populous cities, 20.87 to 20.90 vols. in 100 vols. of air.

The air in sewers and drains contains much less oxygen, as some of it combines with the carbon of putrefying organic matter forming carbonic dioxide. The amount of nitrogen in the air of sewers is little different from that in the atmosphere which we breathe; but the amount of carbonic dioxide present is greatly increased.

The lowest amount of oxygen in sewer air is recorded to be 17.4 vols. in 100 vols. of air; the amount of carbonic dioxide is in the *average* 2.3 vols. in 100 vols. Sulphuretted hydrogen varies greatly, but the quantity is generally so small as not to be easily determined. Still more difficult is it to find by chemical analysis the proportion of other gases of decay.

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*See Prof. W. Ripley Nichols' report upon chemical examination of the air of the Berkeley street sewer, in Boston, Mass., 1878.

In well ventilated and well flushed sewers, Dr. Russell, of Glasgow, found the following ratio:

20.70 vols. of oxygen in 100 vols. of air.
78.79 vols. of nitrogen in 100 vols. of air.
0.51 vols. of carbonic dioxide in 100 vols. of air.
No sulphuretted hydrogen in 100 vols. of air.
Traces of ammonia in 100 vols. of air.

Carbonic oxide is present only in excessively minute quantities, and even then it may have entered the sewer or drain through leakage of illuminating gas from gas mains.

In the absence of more satisfactory methods of analysis, it is usual with chemists to determine the amount of pollution of the air, or the organic matter in it, by determining the amount of carbonic dioxide present, assuming that there is a certain fixed proportion between the amount of carbonic dioxide and the organic matter.* Thus, Prof. W. Ripley Nichols records as the average of many carefully conducted experiments in Boston, the amount of carbonic dioxide in a sewer in that city as follows:

The average of

31	determinations	in	January, 1878, was	8.7	vols. of	CO_2	in 10,000	vols. of air.
44	"	"	February, 1878, was	8.2	"	"	"	"
47	"	"	March, 1878, was	11.5	"	"	"	"
12	"	"	April, 1878, was	10.7	"	"	"	"
8	"	"	June, 1878, was	27.5	"	"	"	"
8	"	"	July, 1878, was	21.9	"	"	"	"
6	"	"	August, 1878, was	23.9	"	"	"	"
7	"	"	January, 1879, was	8.0	"	"	"	"
14	"	"	February, 1879, was	11.6	"	"	"	"
20	"	"	March, 1879, was	11.8	"	"	"	"

He remarks: "It appears from these examinations that in such a sewer as the one in Berkeley street, which, being of necessity tide-locked, is an example of the worst type of construction, the air does not differ from the normal standard as much as many, no doubt, suppose. In a general way, as we have seen, there is a larger amount of variation from normal air during the warmer season of the year; but even when the amount of carbonic acid was largest, it was only extremely seldom that sulphuretted hydrogen could be detected." . . . . . "I think it should be said that the soil-pipes and house-drains are much more likely causes of discomfort and danger than the sewers."

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*Such is strictly true only for air fouled by respiration, while it may not give accurate results in other cases.

In regard to this interesting question I must refer to the Report of Prof. Ira Remsen on the subject of organic matter in the air, published in the National Board of Health Bulletin, vol. 2, No 11.

Hence the importance of a thorough ventilation of all the soil-, waste- and drain-pipes in a building.

The question here naturally arises: Are the above found constituents of sewer air the origin or cause of the sickness so commonly attributed to the inhaling of sewer gas? The answer is that, although many of the above gases are poisonous, if inhaled into the system in large quantities, and may, even if present in smaller quantity, cause nausea, asphyxia, headache, vomiting, etc., none of them can be said to *produce* any of the so-called "filth-diseases." To determine the exact origin of these is a still unsolved problem of physiology. While some believe that the particles of decomposing organic matter, present in sewer air and known as "organic vapor" cause disease, others seek the origin of the latter in microscopic *spores* or *germs* which live and feed upon such organic vapor and are capable of reproduction under favorable conditions, such as presence of putrefying filth, excess of moisture, heat, lack of oxygen, etc.

Whatever theory may be accepted as true, it is evident that, by preventing the decay of organic matter within sewers, drains and soil-pipes, and by depriving these germs (if such be the cause of disease) of the conditions facilitating their reproduction, we can best prevent the outbreak of excremental diseases. In other words, *by completely removing as speedily as possible all waste matters from the dwelling by pipes thoroughly and tightly jointed, and by a sufficient dilution of the air in these pipes with oxygen, the danger of infection, arising from defective drainage and plumbing, may be reduced to a minimum.*

The unhealthiness of dwelling houses has been greatly increased by cheap and therefore careless plumbing, through ignorance or intention of builders. The consequence was a growing inclination with some to abandon all plumbing fixtures, to go back to the ill-famed privy in the backyard, and to follow the practice of throwing the slops from the kitchen upon the grounds in the rear yard.

But, cannot with careful, conscientious and honest workmanship, carried out under the strict supervision of an expert, this risk be avoided? Is it such a difficult thing to have a proper and judicial arrangement of the drainage system?

I shall endeavor in the following pages to explain what the essential elements of a well-devised system of house drainage and sanitary plumbing are. Much has been written of late about this subject. It has been well and thoroughly treated by able writers and my paper can hardly claim much originality or novelty, but should be taken as the outgrowth of much study and experience.

The essentials of a perfect system of house drainage are simple and can be readily understood by any householder, when carefully explained. They involve nothing more than the proper application of well-known laws of nature. I hope to succeed in convincing the reader that there is no mystery, no secrecy about any part of the work. Any one building a house is able to secure the essential elements of good drainage and plumbing without having to resort to any patented system. The proper way of laying and trapping drains, of ventilating soil- and waste-pipes, etc., cannot, in my judgment, be patented. The plumbing fixtures are, of course, mostly patented, as any useful appliance may be, and in speaking of these one cannot avoid recommending some patented device.

I shall assume that the entire sewage of the dwelling delivers either into a regular system of sewers, or else discharges into an open water course; or—in the absence of either—runs into a cesspool, be it a leaching cesspool, or a well-cemented, tight vault of brickwork; or finally, into a flushtank, to be disposed of on the grounds by surface irrigation, or below the ground by the subsurface irrigation system.

So far as the arrangement of the *inside* plumbing work is concerned, it does not make any material difference, which of the above systems of getting rid of the waste-water from habitations, is available.*

Under all circumstances the three cardinal objects to be fulfilled by a perfect system of house drainage are:

1. To remove from the inside of the dwelling as quickly as possible all liquid and semi-liquid wastes, whether it be the soapy discharge from wash bowls, bath tubs and laundry tubs, or the vegetable refuse from the scullery sink, the greasy matter from kitchen and pantry sinks, or the foul discharges from slopsinks, urinals and waterclosets.

2. To prevent the foul gases, originating from the decomposition of the above matters in the drain, sewer, cesspool or flushtank, from returning through the same channels into our dwellings.

3. To oxidize and render innocuous by a copious flushing with air the foul gases due to the possible putrefaction of waste matters within the house drains, soil- and waste-pipes, at the same time properly protecting all outlets of fixtures from the entrance of these gases.

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* It is not intended in this paper to discuss the merits and faults of these different methods of sewage disposal.

The subjects to be considered are:

1. The drains outside of the house.
2. The drains inside of the house.
3. The soil- and waste-pipes.
4. The ventilation of drains and pipes.
5. The trapping of the main drain.
6. The trapping of all wastes under fixtures.
7. The various plumbing fixtures.
8. The drainage of cellars.

DRAINS OUTSIDE OF THE HOUSE.

The house drain is the means for conveying the sewage from the dwelling. Its proper material is a question of great importance. Outside of the dwelling it should be of vitrified pipe, circular in shape, which is superior to cement pipe.* Neither brick channels nor wooden conduits should be used for this purpose. Only strong, hard, well-burnt, vitrified pipe, free from cracks or other defects should be used. Four inch pipes and those of smaller size are especially liable to warping, and should be carefully inspected and selected. The interior of these pipes should be well-glazed and smooth throughout; the pipes should be impervious, true in section, perfectly straight, and of a uniform thickness. Four inch pipes should have a thickness of $\frac{1}{2}$in. to $\frac{5}{8}$in.; six inch pipes $\frac{11}{16}$in. to $\frac{3}{4}$in.; nine inch pipes should be not less than $\frac{3}{4}$ inches thick; twelve inch pipes should be 1 inch thick; 15 inch pipe $1\frac{1}{4}$in., and 18 inch pipe should have a thickness of $1\frac{1}{2}$ inches.

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*Iron pipe for outside drains is preferable in made ground, or in quicksand, also where trees are near the line of the drain, and where the drain must necessarily pass near a well furnishing the water for the household.

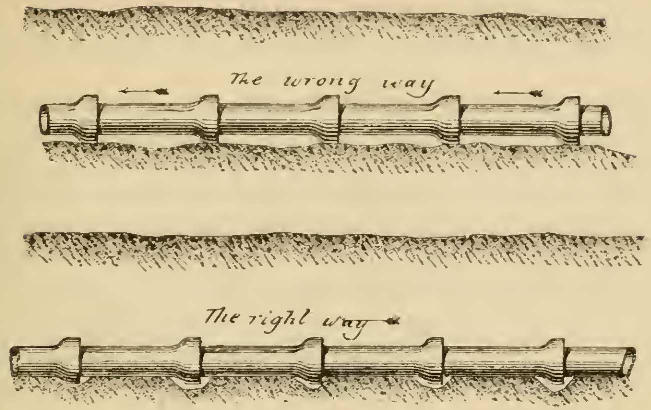

FIG. 1.

Care should be taken to lay the pipes on a firm bed of sand or gravel, and if this is not available, a concrete base should be provided in the trench. Special grooves should be cut for the sockets, in order to give the pipe a solid bearing on its entire length (see Fig. 1). All pipes should be laid in straight lines, all changes of direction should be effected by curves of as large a radius as possible, formed of bent pipes. All branches should join the main under an acute angle, by special Y pieces (see Fig. 3), for a right-angled junction (by a T branch, Fig 3a) tends to form eddies and consequently deposits in the main drain. If the drain discharges into a public sewer the connection should be made as shown in Fig. 2.

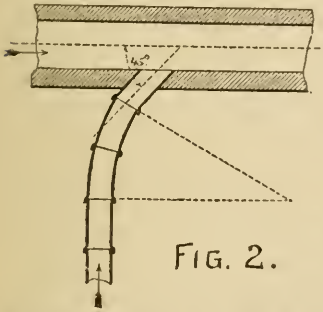

FIG. 2.

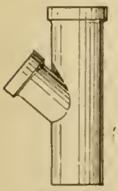

FIG. 3.

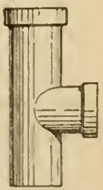

FIG. 3a.

The joints of the pipes should receive particular attention. The danger arising from imperfect or leaky joints is twofold, namely, first, the sewage, by soaking into the ground, pollutes the soil and endangers the purity of the water supply in places where houses are dependent on wells and cisterns for water. The ground around and under the house is more and more subject to contamination, and in winter time, when there is a strong inward draft into houses from fireplaces and stoves, the tainted "ground air" is thus sucked into our very living and sleeping rooms, often producing severe illness. The second danger resulting from leaky joints is equally patent. The solid matters, carried in suspension in the pipes, are deprived of a part of their liquid carrier, and thus tend to accumulate and form deposits in the house drain, which deposits soon undergo decomposition, and fill the drains and pipes with noxious gases.

In order to prevent the leakage of joints, the spigot and socket ends of pipes should be concentric. Into the annular space between spigot and socket introduce a small gasket of picked oakum, rammed into this space by a hand iron. Then fill the remainder of the space with hydraulic cement, or cement mixed with an equal volume of sand (never use any *lime* in the mixture). Particular attention should be paid to the bottom part of the joint, where the mortar should be pressed into it with the fingers. Finally wipe some cement in front of the socket. The workman should always have a rattan and a rag, with which to wipe the inside of the last joint, in order to clean the drain from projecting parts of cement or mortar, which would tend to cause deposits. Some object to the use of cement for drain pipe joints, claiming that the stiffness of the cement joint after hardening will tend to break the pipes in case of a slight settling. They also maintain that some cements increase considerably in volume when setting, and tend to burst the sockets. They much prefer a ring of puddled clay, pressed into the joint and wiped around it, claiming that clay will make a tight and more elastic joint. But in ordinary cases the settling of drain pipes may be prevented by providing a solid foundation of either gravel, sand or concrete, or in very wet ground, boards or piles as supports to the pipe. In made ground I should recommend the use of iron pipes to prevent leaky joints or breakage of pipes. A good Portland cement will not much increase in volume after setting, and I believe it has been shown that those cements which largely increase their volume, often lose their hardness after some time, and would be, therefore, unfit for any use. While I fully appreciate the advantage of a somewhat elastic joint, I do not think that puddled clay will make as tight a joint as seems desirable for drains carrying foul sewage.

What is known as "Stanford's Improved Pipe Joint" has been used extensively of late in works of house drainage in England, and its superior merits are such as to recommend it for use with us. I, therefore, introduce a brief description. "In sewer work in bad or wet ground, just where a sound joint is most required, the difficulty of making it is the greatest. What is wanted, therefore, is a joint that will entail the least disturbance of the ground, that will not necessitate the absolute drying of the trench bottom, and that will require the minimum of time, skill and labor in making it. These conditions will be fulfilled in the most complete manner by making the spigot of one pipe to fit mechanically into the socket of another, as in a bored and turned iron pipe joint. Such a mechanical fit cannot be obtained with stoneware or earthenware pipes, owing to the difficulty of preserving perfect accuracy of form during the process of burning."

"In the Stanford joint tightness is obtained by casting upon the spigot and in the socket of each pipe, by means of moulds prepared for the purpose, rings of a cheap and durable material, which, when put together, fit mechanically into each other, and by making these rings of a spherical form, a certain amount of movement or settlement may take place without destroying the accuracy of the joint. In laying these pipes, therefore, all that is necessary is to insert the spigot of one fairly and firmly into the socket of another previously laid, and the joint is complete and perfectly water tight. A smearing of some kind of grease is frequently found to be of advantage."

Half-socket or access-pipes are sometimes useful, where it becomes necessary often to inspect the house drain. They should be located close to angles, bends, junction branches, running traps, etc. They are not much used in this country, owing, probably, to the fact that, should the main drain run over one-half full, sewage may leak out through the access-pipes into the soil.

In laying drains, care should be taken to avoid, as much as possible, trees. The roots of these are frequently found to penetrate and often choke the pipes, and are certainly a dangerous obstruction to the flow in the drain. If the line of the drain must necessarily pass near trees, the use of iron pipes is recommended. The coating of the pipes with coal tar on their outside, the use of asphaltum for joints, and sometimes the surrounding of the drain with a strong layer of concrete are said to be effectual protection against roots of trees.

I now must speak of the *grade of the drain*, as this is a matter of prime importance. Upon the inclination of a pipe depends the *velocity* of the water flowing through it. If this velocity should be insufficient, deposits will occur, and the drain will in time become choked. Pipes of 4 inches diameter should have a velocity of flow of from 3 to 4½ft. per second; those of 6 and 9 inches diameter should have a velocity of not less than 2½ to 3ft. A velocity of 2ft. per second should be considered the minimum allowable in house drains. As a general rule the inclination of a house drain should be as great as attainable, and must be, wherever local conditions will permit, continuous. It is not unfrequently found by uncovering old drains that, in order to save digging, they are laid very flat — nay, often level — from the point where they leave the house to nearly their junction with the sewer, at which place they are turned with a steep pitch downwards, and often enter the sewer at its crown. By distributing the whole available fall over the total length of the drain a much better grade would have been secured.

In order to lay a drain with a true grade, especially where the fall is little, a level should be used. The elevation of bottom of pipe, where it leaves the house — at a depth of not less than 3 feet in the New England States, as a protection against frost — should be ascertained, as well as the elevation of the junction with the sewer (or else inlet to cesspool or flush tank). A profile of the ground along the line of the drain should also be determined by levelling. Thus, the proper available fall can be determined, with a little additional trouble, it is true, which, however, will be well repaid by securing a much better quality of the work.

A fall of from 1 in 40 to 1 in 60 is desirable for pipes of 4 or 6 inches diameter, but this cannot always be had. I would consider a grade of 1 in 100 as the least to be given to small house drains, in order to keep them self-cleansing. When laid with such fall and running full or half-full, a six-inch drain has a velocity of 3½ feet, a four-inch drain a velocity of nearly 3 feet, which is sufficient to carry along such suspended matters as only ought to enter a house drain. Where the available fall is less than 1 in 100, special flushing apparatus, such as Field's flush tank, McFarland's tilting tank, or Shone's hydraulic syphon ejector should be used. The former seems to many preferable, as it is free from all movable parts which are liable to get out of order, unless carefully and continually watched.

I have thus fully explained the right method of laying drain pipes, because, even with the best plumbing inside of the house, it is of the greatest importance to have the outside drains of good quality, properly laid, and properly jointed.

The next question to be considered is: *What is the proper size for house drains?*

This will, of course, depend to some extent upon the grade of the drain, the size of the house and number of its occupants, the amount of water used per head per day, and finally, unless the rain falling upon the roof is stored in a cistern, upon the amount of rain-fall to be carried off in a certain time. This rain is a most beneficial scourer for drains, and unless the sewage of the dwelling is to be disposed of by irrigation, or the sewers of the town built according to the "separate system," which excludes the rain-fall from the channels carrying sewage, I should strongly advise to deliver it into the same channel, which carries away the foul wastes of the habitation. Even with this double purpose in view the house drain need not be very large, and the closer its size is proportioned to the volume of water it must carry the more *self-cleansing* will it be. This is easily understood, for the same stream that fills a 4-inch drain half-full will spread out at the bottom of a 9-inch pipe, and, having less velocity, will be unable effectually to remove sediment [see Diagram II in Appendix I].

For an ordinary city dwelling a drain four inches in diameter is ample, even including all the rain-fall. For a larger lot and residence a six-inch drain is all that is needed, even if the fall should be only 1 in 100. As a general rule, house drains have been constructed of too large a diameter, and one often meets with the objection that a four inch pipe will clog up with grease in a short time, or will be obstructed by solid substances. To this, I answer, that in regard to grease the only safe way, where it is allowed to waste, or in case of large boarding-houses and hotels, is to keep it altogether out of the drain (which can be easily accomplished by a suitable grease trap). Grease congealing in a drain is sure to clog it, no matter how large it is made. The stoppage would be only a question of time, and nothing could be gained by postponing this inevitable result. In regard to obstructions by solid matters, I may assert that nothing which passes through the strainer of a sink or from the water-closet bowl can possibly obstruct the drain. What may enter through carelessness of servants or of the householder, such as "sand, shavings, sticks, coal, bones, garbage, bottles, spoons, knives, forks, apples, potatoes, hay, shirts, towels, stockings, floor-cloths, broken crockery, etc.," to quote from Mr. J. Herbert Shedd's Report on the Sewerage of Providence, cannot rightfully be expected to be carried away in a drain. To guard against such obstructions, the drain should be made accessible, especially near bends, junctions and the main trap.

Let us now consider the question of the proper size of drains by applying the well-known laws of hydraulics to it. The Diagram I, in Appendix I, showing discharge, velocity, size and inclination of drains or sewers, has been calculated from Weisbach's formula for discharge of pipes, supposed to run half full. Table No. 1, in the same Appendix, has been calculated by Robt. Moore, Esq., C. E., late Sewer Commissioner of St. Louis, from Weisbach's formula for flow of water through open culverts. It gives the size and velocity in house drains, laid at different inclinations, and for various sizes of lots, the rain-fall being 2 inches per hour, and the pipes running ¾ full. Table No. 2 (ibidem) from the same author, gives diameters of drains and sewers, capable of discharging 1250 gallons per house (of 25 feet front) per day, running three-fourths full at various rates of inclination. It should be said that the smallest sizes of the tables (below 3 or 4 inches diameter) are given only for the sake of completeness, and not as sizes to be recommended for actual use.

We shall assume, for an example, an ordinary city lot of 25 × 150 ft. = .0861 acres. The rain-fall to be provided for may be 2 inches per hour. Though such storms are not frequent, provision should be made for them in the calculation of the size of house drains, as the rain falling on roofs and on paved yards reaches the drain very soon after having fallen. A rainfall of 1 inch per hour per acre very nearly yields 1 cubic foot per second, therefore 2 inches per hour give 2 cub. ft. per sec. per acre. The number of cubic feet of rain from the above lot is therefore .0861 × 2 = .1722 cub. ft. per second or 60 × 1.722 = 10.332 cub. ft. per minute.

We further assume 6 persons to the house, and 75 gallons per head per diem, which is a very liberal allowance. The waste water of the house is therefore 6 × 75 = 450 gallons per day. If one-half of this amount is estimated to run off in 8 hours, the maximum per hour would be about 28 gallons or 0.0624 cub. ft. per minute. This quantity is so insignificant compared with the rainfall that we may safely neglect it.

If the drain has a fall of 1 in 60, and shall not run over one-half full, Diagram I shows that a pipe 4 inches in diameter is sufficient to carry off 10 cub. ft. per minute. Should the drain be allowed to run three-quarters full, and have a fall of 1 in 100, a diameter of 3¾ inches would suffice, according to Table 1.

As a second example, I shall take a large lot, say 80 × 150 ft. = .2755 acres. The quantity of rain to be discharged will be, under the same suppositions as above, 2 × 60 × .2755 acres = 33.06 cub. ft. per minute. The diagram I gives the necessary size of pipe, for a fall of 1 in 50, to be a little over 6 inches, supposing the drain to run half-full. For a drain, running ¾ full, Table 1 gives the necessary diameter=5¼ inches.

These two examples are believed sufficiently to explain the use of the diagram and table appended. If the rain should be excluded, it will be seen from Diagram I that a 4-inch pipe, laid at a grade of 1 in 100, and running half-full discharges 7.5 cub. ft. per minute, or 10800 cub. ft. per 24 hours. Assuming 75 gallons or 10 cub. ft. per head per 24 hours, and doubling this to provide for a maximum flow, it will be seen that this quantity is equal to the sewage of $\frac{10800}{20}$ = 540 persons or of 90 houses (6 persons to a house).

For such calculations Table 2 of the Appendix becomes useful. It will be seen from it that a 6-inch drain, running three-quarters full, laid with a fall of 1 in 50, is large enough for the sewage proper of 400 houses, assuming 1250 gallons per house per day, which is an ample allowance.

The foregoing explanations have, I believe, sufficiently proved that *no house drain needs to be larger than six inches* under ordinary circumstances. Any increase of size beyond this would tend to be a detriment rather than a benefit.

DRAINS INSIDE OF THE HOUSE.

The earthenware drain should end at about 5 to 10ft. outside of the foundation walls of the house. From this point towards the inside of the house the drain should be of iron. The joint between iron drain and earthernware pipe should be made with pure hydraulic cement. Where the iron pipe passes through the wall, a relieving arch should be built over it. Settlement of walls often occurs, and is liable to crack the pipe or even break it, unless the above provision is carried out. It is quite evident that, under no circumstances whatever, this part of the house drain should consist of vitrified pipe.

Important as it is to have the drains outside of the house free from sediment or leakage, it is still more so to have all the pipe joints inside of the dwelling perfectly air and water tight, for if any defect should exist here, sewer gas will leak into the cellar and pervade the whole house. For this reason we sometimes find the cardinal rule laid down that no drains should run under a house, but should be taken outside of it as soon as possible. This is not practicable, as a general rule, in the case of narrow city lots. Fortunately, however, we can, with perfect safety, run the drains across the basement or cellar floor of a dwelling, provided we choose the only safe material, i. e. *iron pipes.* A good mechanic is able to make with these a perfectly air and water tight joint.

The best course of the iron drains in the house is along the ceiling of the cellar, or along one of the foundation walls. In other words, wherever practicable, the iron drain ought to be kept *in sight,* in order to enable anybody to detect a leaky joint at occasional inspections. Sometimes fixtures located in the cellar, such as servants' water-closets, laundry tubs or sinks, make it necessary to lay the iron drain below the cellar floor. In this case it should be laid with proper fall in a trench, the sides of which are walled with brick work, and the base of which should consist of a layer of from 4 to 6 inches of concrete, thoroughly rammed and properly graded. The trench should be made accessible by closing it with movable covers of iron or wood.

If the drain is carried in sight, I would much prefer supporting it by strong iron hooks from the cellar wall, instead of suspending it by iron hangers from the main joists of the floor above. For, with the latter arrangement, a slight lowering or bending of the beams supporting the iron drain, would tend to loosen the joint between water-closet trap and soil pipe, as the latter is rigidly connected with the drain, thus creating a source of danger from leakage of sewer gas.

As regards the proper inclination of iron drains in the cellar the rules given for the outside drains should be observed.

The principles stated for the size of the outside drain apply with equal force to the inside drain. If no leaders enter the drain at its upper end or along its course through the house, a 4-inch pipe is ample for any ordinary sized dwelling; a 6-inch drain is very seldom required.

As a good precaution for repairs or cases of obstructions of the drain, I would recommend the practice of many plumbers, which consists in inserting at distances of about 10 or 20 feet along the course of the iron drain Y branches, the ends of the branches being closed by a brass thimble, caulked into the hub of the Y, and closed by a trap screw. By opening these and inserting a proper cleaning tool, occasional obstructions by introduction of foreign matters are easily removed.

The course of the main drain in cellar should be as straight as possible. All changes of direction should be made by iron bends. All junctions with the main drain should be made by Y branches, in order to join the flow of both pipes without causing eddies; no right-angled junctions should be made in any horizontal or inclined pipe.

SOIL AND WASTE PIPES.

Into the iron drain the vertical soil and waste pipes enter by means of either quarter bends or by a Y branch with an eighth bend.*

The best material for soil and waste pipes is cast iron. All cast iron pipes used in house drainage should be thoroughly sound, of a *uniform* thickness throughout, and must allow of ready cutting without splitting. The inside should be truly cylindrical and of smooth finish. The thickness of ordinary (so-called *light*) soil pipe is about $\frac{1}{8}$ of an inch for 2, 3 and 4-inch pipes, and $\frac{5}{32}$ to $\frac{3}{16}$ of an inch for 5 and 6 inch pipe. For all large public or private buildings I should always insist upon the use of *extra heavy* soil pipe, which is about double as thick as the ordinary pipe. The weights of extra heavy pipe (as manufactured by the J. L. Mott Iron Works, N. Y.) are about as follows:

2 inch pipe,	5½lbs per foot.
3 inch pipe,	9½lbs per foot.
4 inch pipe,	13lbs per foot.
5 inch pipe,	17lbs per foot.
6 inch pipe,	20lbs per foot.

Great care should be exercised by plumbers, architects, plumbing inspectors and sanitary engineers in regard to the *uniform* thickness of iron soil pipe. The writer has lately seen specimens of extra heavy

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*As non-professional readers may be in doubt about the exact meaning of the terms drain pipe, soil pipe, and waste pipe, I quote the following clear explanation from the "Sanitary Engineer," Vol. 4: "The drainage system of a house, including the pipes or channels of any kind connecting it with the sewer or cesspool, may be divided into two parts — first, that part which is chiefly outside the house walls, and second, that which is generally inside the house. The first is called the *house drain*, or simply *drain*, and conveys the whole body of wastes from the house, including both the discharges from water-closets and urinals, and from baths, basins, sinks, etc., to the sewer or cesspool. The *drain* is practically *horizontal*, and may be considered as terminating either at the house wall, or at the most remote point at which it receives the pipes from any fixtures. The word *drain* is, however, also used in another sense as distinguished from *sewer*. It then means the pipe or channel which conveys only rain or ground water, as distinguished from sewage. An example of soil pipe where the pipe was almost as thin as a knife blade on one side, while it had far more than the required thickness on the other side, the weight being as specified. Measuring the thickness of iron drain pipes by a pair of calipers should be recommended, but I am not aware that it is done at all now.

Iron soil pipe, the inside of which has been made smooth by dipping the pipe into a hot solution of coal-tar pitch, is superior to ordinary iron pipe. This coating, when applied to the outside of the pipe, forms a good preventive against rust or corrosion, and is better than any paint applied to the iron. Where economy is no object, the *enamelled* pipe may be used, which has a very smooth inside surface, thus securing to well-flushed soil pipes the greatest possible cleanliness. Whether iron pipes are coated with coal-tar pitch or enamelled, it is necessary, before applying either of these protective coats, carefully to test each pipe for defects, sand holes or cracks, by the hammer test. The coating may effectually cover these defects and render detection difficult.

Iron pipes are manufactured in lengths of 5 feet, with hub and spigot end, or else with double hub. In badly drained houses, with cheap plumbing work, it is not uncommon to find the joints of pipes made only with sand and paper, or with putty, mortar, cement, sulphur and pitch and red lead, or other material. All of these joints are worthless, and therefore extremely objectionable.

Joints of iron pipe should be made by first inserting a little picked oakum into the socket, care being taken that no part of this gasket enters the pipe. The oakum prevents the molten lead from running into the pipe, where it might form an obstruction to the flow. Molten lead is then poured into the hub, enough to quite fill it. As lead shrinks in cooling, it must afterwards be carefully hammered with a special caulking tool, thus filling the space between spigot and hub, so as to make a perfectly gas and water tight joint. In order to be able, at all times, to inspect the joints, it is a good practice to leave the caulked lead without a cover of paint, cement or putty, the marks of the caulking tool being thus left exposed to view.

A tight joint can also be made by a mixture of sal ammoniac, iron filings and sulphur. I am not sufficiently familiar with such "rust joints" to speak of their merits.

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this kind of drain is the separate system of pipes, used to convey only rain water in some towns and the tile pipe commonly employed in draining wet lands.

That part of the house drainage system which is generally inside the house, including the pipes from the various fixtures, is made up of *soil pipes* and *waste pipes*. *Soil pipes* are those pipes which receive *human excreta* from water closets and urinals, and they are still called soil pipes, even if they also receive the waste water from baths, basins, etc. On the other hand, *waste pipes* are those which receive *only* the waste water from these latter, but not the discharge from water closets and urinals. The *waste* pipes of a house may either enter the *house drain* independently, or join the *soil pipe* first and discharge their contents through it into the *drain*. As distinguished from the *drain* the *soil pipes* and *waste pipes*, at least for the longer lengths, are generally vertical "

The iron works manufacture not only straight soil pipe, but a large number of fittings, such as quarter bends, eighth bends, sixth bends, long and return bends, T branches, Y branches, double Y branches, half Y branches, offsets, single and double hubs, increasers, reducers, etc., to enable the plumber to make all possible connections and lines with iron pipe.

In England *lead pipe* is preferred for soil pipes. According to one of the best English authorities on plumbing* the advantages claimed for lead pipe are briefly as follows:

1. It is smoother, cleaner, not so corrosive; more durable.
2. It can be bent to suit any position; it is more compact.
3. Its joints are more to be depended upon than iron pipe joints.
4. Urine, being very corrosive, acts more on iron than on lead.
5. Iron pipe rusts on the outside, and painting iron pipes, to prevent it, is expensive, and is generally not done thoroughly at the back of the pipe.
6. Lead branch wastes or traps cannot easily be joined to iron pipe.
7. Iron pipe does not allow caulking joints with lead, therefore cement is used for the joint.

From all this I disagree, for: 1. Tarred or enamelled iron pipe is fully as smooth as lead pipe, and the iron pipe is thereby well protected from corrosion.

2. The above enumerated variety of special fittings enables the plumber readily to adapt his iron pipe to almost any position; moreover I do not see why iron pipe should take up a great deal more room than lead pipe of same bore.

3. *Well caulked* joints of heavy iron pipes are just as sound and trustworthy as wiped joints in lead pipes, and any good mechanic is able to make them.

4. Urine does not corrode an iron soil pipe, protected by a coal-tar pitch solution or by enamel, more than a lead pipe.

5. The outside of iron pipe can be efficiently protected from rusting by paint, coal-tar pitch or enamel.

6. Lead cannot be caulked into iron, but a good plumber always solders a brass ferrule by a wiped joint to the lead pipe (or trap), and caulks the brass ferrule into the hub of the iron pipe.

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*S. Stephens Hellyer, "The plumber and sanitary houses," 2d edition.

7. Any one who will take the trouble carefully to examine the joints of iron pipe, made by an honest and conscientious plumber, will readily admit the possibility of making tight joints with iron pipe. Only iron pipe of a sufficient strength to withstand the knocking occasioned by caulking the lead is used in American plumbing.

But, while iron pipe is fully equal in all the above respects to lead, it has great advantages over it. "Lead soil pipes are very heavy, and, therefore, liable to sag and split open, to have holes eaten into them by rats, and have nails driven into them by carpenters, and also to corrode, and they require much greater skill to put up, and involve more expense; therefore the statements* above prove nothing, although they demonstrate the absurdity of bricking soil pipes into a wall, and the necessity of so placing them that they are at all times readily accessible for inspection; and also prove what few people seem to realize, that the drainage system of a house requires periodical testing and inspection just as much as a steam boiler or piece of machinery."†

The same remarks apply to the material of waste pipes; it is not uncommon, however, to find vertical waste pipes of lead, as these are much easier placed inside of a partition wall, and covered with plaster. But this cannot be regarded as good practice. It is certainly much preferable to run soil pipes and waste pipes in sight, so that they may be accessible. I decidedly condemn the usual plan of architects of building recesses or niches in the walls for pipes. The difficulty of caulking the back part of pipe joints in this position is very great. Where objection exists to having the pipes in sight, they should be boxed up, but I would always insist upon having the cover fastened by screws, which can be easily removed, and not by nails.

I have now to speak about the *proper size* of soil pipes and waste pipes. *Soil pipes* ought never to be larger than 4 inches inside diameter; this size will answer for even half a dozen water-closets on one vertical stack of pipe, and on different floors. I may here remark that, contrary to the generally entertained opinion, a nearly horizontal or inclined pipe can be kept clean by flushing much easier than a vertical pipe. The flushing water in this latter case soon assumes a whirling motion, and the scattered drops fall downward without exerting much scouring action upon the interior of the pipe. Hence the importance of having the inside as smooth as possible to prevent solid matters from adhering to the sides, where hardly any amount of flushing will take them off.

Waste pipes of iron should be 2 inches in diameter. This is ample for the waste water of one or more bath-tubs, and a large number of wash-bowls.

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*In Hellyer's book, "The plumber and sanitary houses."

†See articles on "Plumbing Practice," in the Sanitary engineer, vol. 4.

The arrangement of soil and waste pipes should be as direct as possible. It is desirable that each vertical stack should extend from cellar to roof in a straight line. In planning the plumbing for a dwelling too much care cannot be taken to secure such an arrangement. Every offset, every bend in the pipe forms an obstruction to its proper flushing, with both water and air. Horizontal soil pipes are especially objectionable; the water-closets, baths, bowls and sinks should always be located in groups, and as near to their respective pipes as possible. Branch pipes should always enter the vertical stack by means of a Y or half Y branch; a right-angled connection is objectionable.*

If a lead pipe joins an iron pipe, the connection should be effected by means of a brass ferrule of same bore as the lead pipe, and soldered to it, wherever space allows, by a wiped joint. The ferrule is introduced into the hub of the iron pipe, and caulked tightly with a gasket of oakum and molten lead.

Iron soil and waste pipes should be supported at distances of not over 5 feet by strong iron hangers or hooks.

For all minor wastes *lead pipe* is used. It is manufactured in long coils, and can easily be handled. It may be bent and cut to suit all possible positions, and requires but few joints. It is manufactured of all sizes and of any desired thickness. In good plumbing work only heavy lead pipe should be used, to prevent its being quickly destroyed by the action of sewer gas. Lead pipes should be fastened to boards by soldering hard metal tacks to the pipe, and screwing the flanges of the tacks to the board. Joints in lead pipe are made with solder wiped around the junction.

The size of lead waste pipes should be as small as is consistent with the office which they have to perform. Wastes for bath-tubs or laundry trays should be sufficiently large to empty these vessels in a short time. J. C. Bayles, in his book "House Drainage and Water Service," recommends the following sizes and weights of lead pipe:

For bath wastes 1½ inches diameter, 3lbs weight per foot.
For bath overflows 1¼ inches diameter, 2½lbs weight per foot.
For wash-basin wastes 1¼ to 1½ inches diameter, 2½ to 3lbs weight per foot.
For wash-basin overflows 1¼ inches diameter, 2½lbs weight per foot.
For wash-tub wastes 2 inches diameter, 3lbs weight per foot.
For kitchen-sink wastes 3 inches diameter, 5lbs weight per foot.

Col. Waring, in an article upon the "Sanitary Condition of New York City," in Scribner's Magazine, speaks as follows: "Every waste-pipe and trap in the house should be restricted as much as possible, the trap being never larger than the pipe, and preferably smaller. For example, the outlet of a kitchen sink should be of 1¼ inch pipe, having a 1 inch trap. With a reasonable and sufficient use, this will keep clean and will remove everything promptly, while a 2 inch pipe with a 3 inch trap will become choked with grease and filth, and will be a constant seat of foul decomposition. . . . . Even a set of laundry tubs will have their whole contents carried away by a 1¼ inch pipe more rapidly than the flow can pass through the strainer of the waste."

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*Unless in the case of a small pipe, discharging into a very much larger pipe or vertical shaft.

After the completion of all piping in the house, it is a good practice —which should under no circumstances be omitted — to test the joints and pipes before connecting the fixtures to them. This is easily accomplished by placing a wooden plug, or, better, an India rubber disc into the end of the iron pipe outside of the foundation walls, thus shutting its mouth tightly. Then close all branch outlets inside the house, and fill the vertical pipes with water.* Allow the water in them to stand for 24 hours; if at a subsequent inspection a lowering of the level of the water should be discovered, there must be a leak at some joint, or else some defect exists in the iron piping. Of course the leak must be found and repaired, and the test should then be repeated, until all joints are sure to be water- and air-tight.

Instead of this test by hydrostatic pressure, an equally reliable test is that with a force-pump and a manometer. Sometimes the "peppermint test" is used; but this seems more suitable for occasional inspections of older work. The test is thus described: "When called on to detect a leak in the soil pipe of a house, the plumber goes at once to the roof, if the soil pipe be carried above the roof; if not, he goes to the uppermost water-closet, and pours into one or the other something like an ounce of peppermint, and follows it up with enough water to insure its being carried the full length of the soil pipe. (The top of soil pipe should be closed, in order to prevent the oil from escaping into the outside air.) "Another man then traces the soil pipe from the bottom, throughout its course; knowing that if there is any crevice through which sewer gas can enter, the pungent odor of the volatile essential oil will be readily perceptible even in the presence of odors of a baser kind. Great care must be taken not to carry the peppermint about the house, otherwise the smell cannot be traced to the drains."

Another test is thus described by Douglas Galton: "To test the drains the fumes of ether or of sulphur may be used. If ether is poured down a soil pipe the fumes will be perceptible in the house at any leaks in the soil pipe or failures in the traps. Sulphur fumes may be applied by putting into an opening made in the lowest part of the drain an iron pan containing a few live coals, and throwing one or more handfuls of sulphur upon the coals, and closing up the opening to the drain with clay or otherwise. The fumes will soon be very perceptible at any leaks or rat-holes in the soil pipe, drains or traps."

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*This test is impracticable in severe cold weather.

ESSENTIAL ELEMENTS OF A SYSTEM OF PLUMBING.

We have thus far considered only the material, size, general arrangement and manner of jointing the drain, soil and waste pipes in a house. We must now consider what the essentials of the system are, in order to secure to the house perfect immunity from sewer gas. Briefly stated, these essentials are as follows:

1. *Extension of all soil and waste pipes through and above the roof.*

2. *Providing a fresh air inlet in the drain at the foot of the soil and waste pipe system.*

3. *Trapping the main drain outside of the fresh air inlet, in order entirely to exclude the sewer air from the house.*

4. *Providing each fixture, as near as possible to it, with a suitable trap.*

5 *Providing vent-pipes to such water-seal traps under fixtures, as are liable to be emptied by syphonage.*

The diagram, Fig.4, showing a section through a city house, illustrates these essential elements of house drainage.

EXTENSION OF SOIL AND WASTE PIPES.

The *first* requirement asks for a vertical extension of all soil and waste pipes through the roof. This extension affords a ready outlet for all gases that would otherwise tend to accumulate inside the waste-pipe system. In the case of soil pipes nothing short of an extension the *full bore* of the pipe will answer this purpose. Waste pipes should be enlarged from the point where they pass through the roof, to four inches diameter, as smaller pipes are liable, in cold climates to become obstructed by the freezing of condensed vapor. Plumbers sometimes use galvanized wrought iron or tin pipes for this extension, but this is not to be recommended. It should be of the same material as the main soil pipe, and its joints should be worked with equal care.

The extension of soil and waste pipes should terminate at a distance from any windows, louvred skylights, or ventilating flues, and at least two feet below the top of the nearest chimney. It is desirable to have this extension as high as possible above the roof, so as well to expose the mouth of pipe to the influence of air currents. In order to pre-

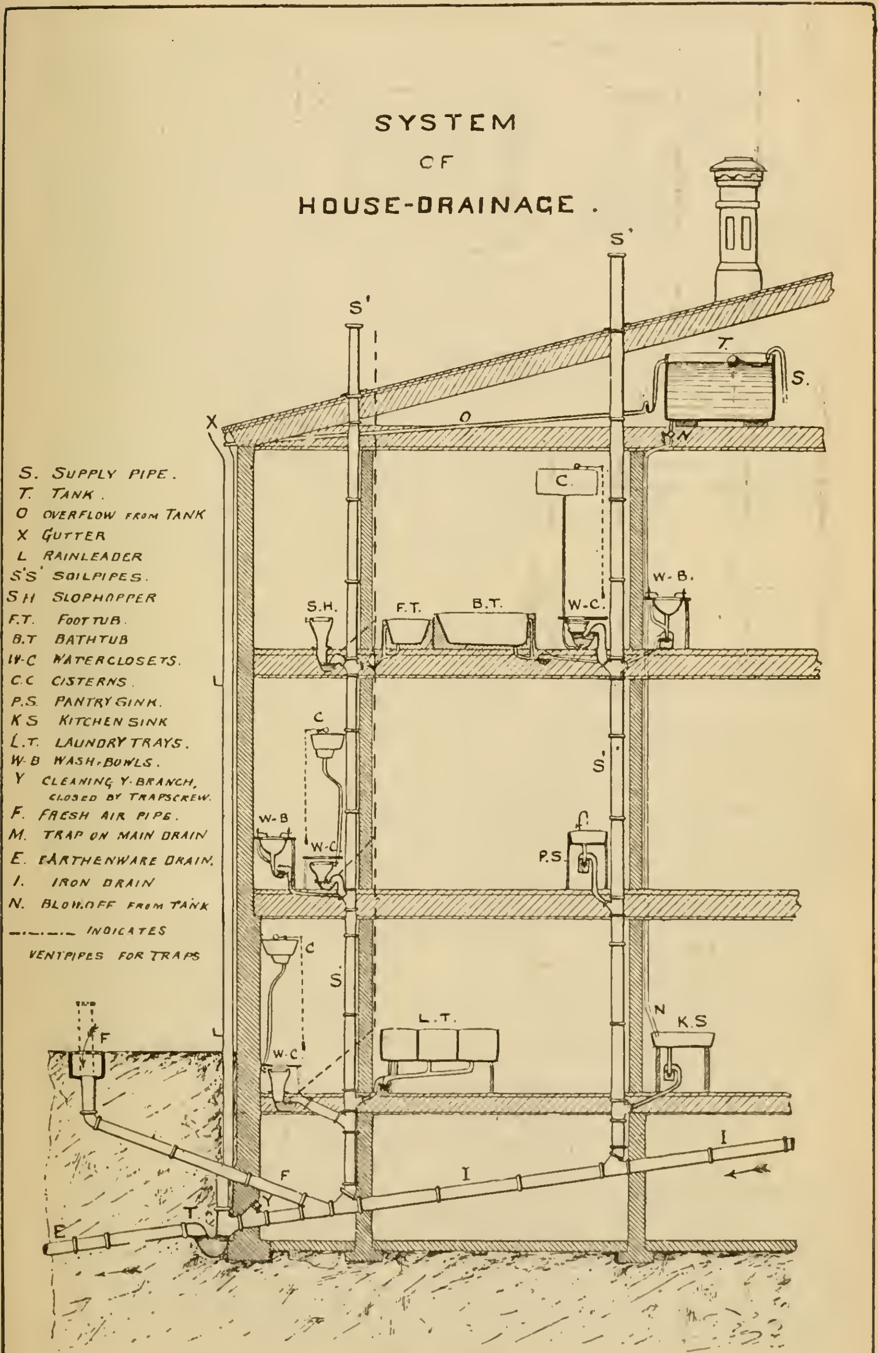
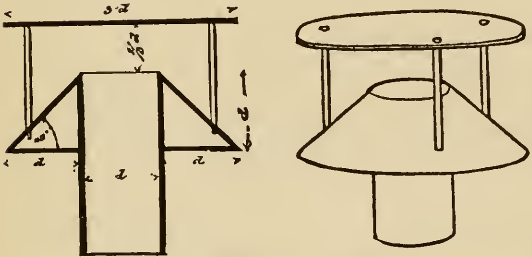


Fig. 4.

W P GERHARD DEL 1882

vent any obstruction of the soil pipes, plumbers often cover the mouth with a return bend. This, however, is objectionable, as it interferes with proper ventilation. I much prefer capping the soil pipe with a suitable fixed cowl, as, for instance, Emerson's Ventilator, Fig. 5, or with Wolpert's Ventilator, the invention of a German engineer, which is shown in Figure 6 in its old and in Fig. 7 in its improved shape. The best plan seems to be to do away entirely with any cover to the soil pipe mouth. Capt. Douglas Galton, in his book "Construction of Healthy Dwellings," says in regard to this: "A tube or shaft with an open top acts best. It is, however, necessary to protect the top to prevent rain from entering the tube; but a cover tends more or less, according to its shape, to delay the current in the tube or shaft." This necessity of covering ventilating tubes, to protect them from rain, does not exist in the case of soil pipes; these may only want protection against malicious introduction of stones or similar articles. A galvanized iron wire basket set into the mouth of the soil pipe will answer this purpose.

FIG. 5.



EMERSON VENTILATOR.

WOLPERT'S VENTILATOR

NEW.

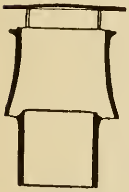


FIG. 7.

OLD.

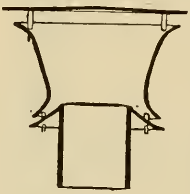


FIG. 6

There is no doubt that open-mouthed pipes have a better upward ventilation than pipes covered with cowls, if the wind blows horizontally or nearly so. Wolpert* in his "Treatise on Ventilation and Heating" states the average useful effect in per cents. of the velocity of the wind, as derived from a number of experiments, to be:

68.6 per cent. for open-mouthed tubes.
51.9 per cent. for pipes capped with Wolpert's new cowl.
35.8 per cent. for pipes capped with Wolpert's old cowl.

for a horizontal direction of the wind. In other words, the upward suction in a tube without any cowl is in the average equivalent to over ⅔ of the force of the wind, blowing over it in a horizontal direction. For pipes capped with Wolpert's new cowl it is only a little more than ½ of the wind force, and for the old cowl it is ⅓ of it. As an average for other directions of the wind Wolpert finds the upward draft in pipes covered with his new and old cowls to be 51.5 per cent. and 34.5 per cent., respectively, of the wind force.*

---

*The inventor of the above illustrated ventilator.

The results of an elaborate series of about 100 experiments upon ventilating cowls, made on seven different days, at different times of the day, and under different conditions of wind and temperature, by Messrs. W. Eassie, Rogers Field, and Douglas Galton was as follows. "After comparing the cowls very carefully with each other, and all of them with a plain open pipe as the simplest, and in fact only available standard, the sub-committee find that none of the exhaust cowls cause a more rapid current of air than prevails in an open pipe under similar conditions, but without any cowl fitted on it. The only use of the cowls, therefore, appears to be to exclude rain from the ventilating pipes; and as this can be done equally, if not more efficiently, in other and similar ways, without diminishing the rapidity of the current in the open pipe, the sub-committee are unable to recommend the grant of the medal of the Sanitary Institute of Great Britain to any of the exhaust cowls submitted to them for trial."

FRESH AIR INLET.

The *second* requirement calls for a fresh air inlet or fresh air pipe. This is no less important than the extension of the soil pipes through the roof. In order to effect a constant movement and change of air in the pipes, two openings are required, an outlet and an inlet. The extension of the soil pipe through the roof provides only an escape for the foul air generated in the soil pipes and waste pipes through the decomposition of foul organic matter, clinging to the interior of pipes and lodging in traps under water-closets and fixtures. But in order to oxidize and thus render harmless this matter undergoing putrefaction within the pipes, a constant introduction of fresh air from the outside atmosphere is necessary. As the soil pipe is warmer in winter time (being in the constantly heated house) than the fresh air pipe, located outside of it, an almost constant upward current in the soil pipe results. In summer time this current is only seldom reversed; for, as a general rule, the top of soil pipe is heated by the sun more than the fresh air pipe near the ground.

There is a second and almost equally important reason for providing a fresh air inlet, wherever the third requirement, the trapping of the drain, has been complied with. Referring to Fig 8 it will be seen that, if a water-closet is used the water discharged into the soil pipe acts like a piston; although it is not likely to fill a 4-inch pipe, it certainly carries the air on its course downward with it by friction. Thus the descending water drives air before it and out through the fresh air pipe; if this had not been provided, it would very likely force the nearest traps under fixtures, and send a puff of sewer gas into the living rooms. This reversed action of the fresh air inlet does not occur sufficiently often to warrant the apprehension of any danger in the location of the inlet. Of course, it should not be too near under windows of living rooms or dormitories. It may be carried away from the house for some distance; it may be placed in the same manhole with the trap (Fig. 9), or it may enter the drain near the foundation wall, just inside of the house, by a T or Y branch (Fig. 4). In rare cases it becomes necessary to carry the fresh air pipe vertically upward through the roof (Fig. 16); this plan would neither be very efficient, as the difference in temperature of inlet and outlet pipe would be small, nor very economical.

---

*The current of air in these experiments was created by a powerful fan, the velocity of the current varying from 8 to 31 metres per second (from 17.9 to 69.3 miles per hour), equivalent to high winds and hurricanes respectively. The diameters of the cowls tested varied from 0.787 to 3.937 inches. It is to be regretted that the author did not extend his experiments so as to include much smaller velocities of current. It is very likely that for the latter the percentage of useful effect of cowls would be much smaller.

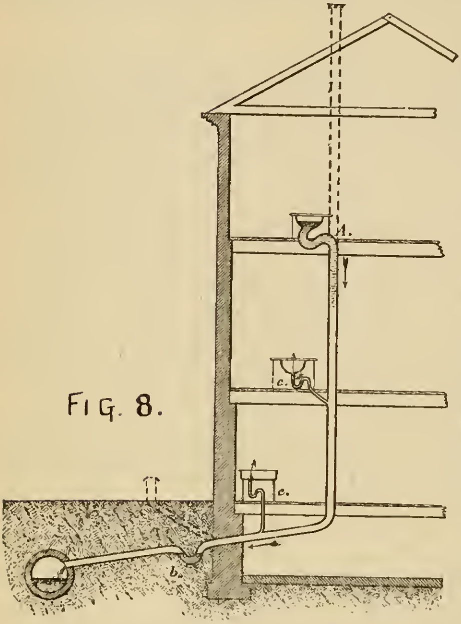


FIG. 8.

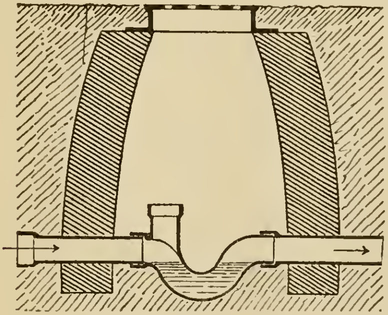


FIG. 9.

Figs 10–18 illustrate various modes of locating fresh air pipe, compiled from actual observations, by Walter G. Elliott, C. E., for the "Sanitary Engineer," Vols. 4 and 5.

As regards size of the fresh air pipe, I would say that nothing short of the diameter of the iron drain would answer; as this is generally 4 inches in diameter, a 4-inch opening for fresh air pipe is required.

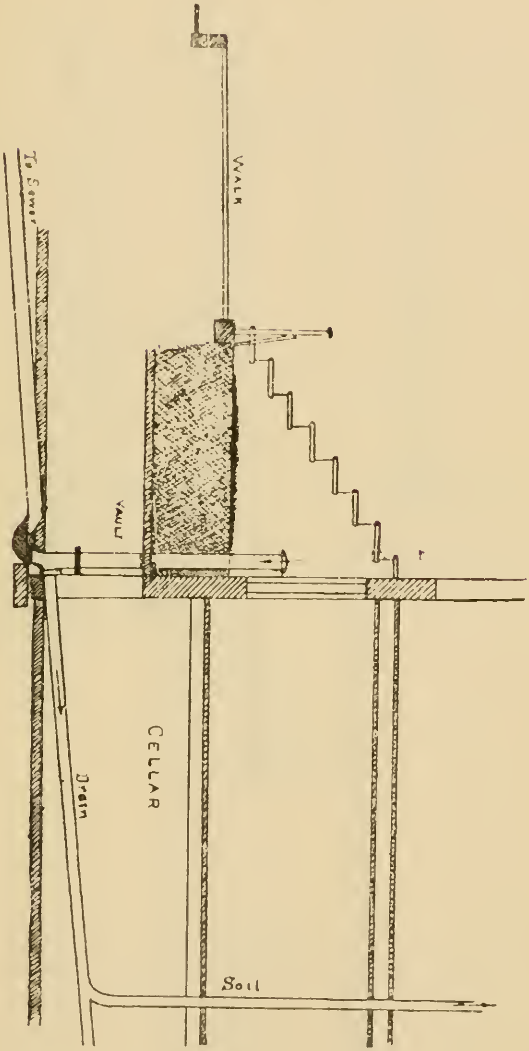


Fig. 10.

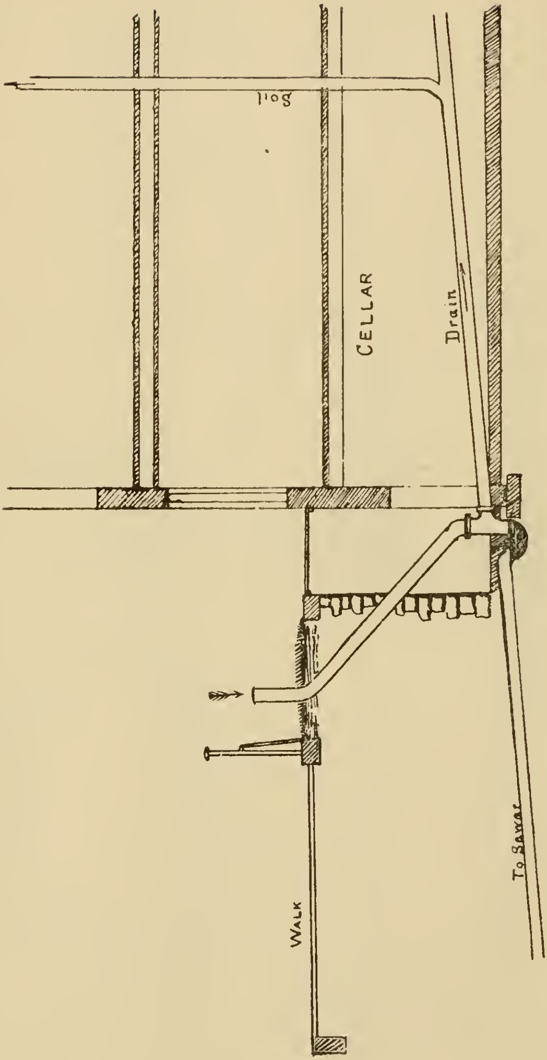


FIG. 11.

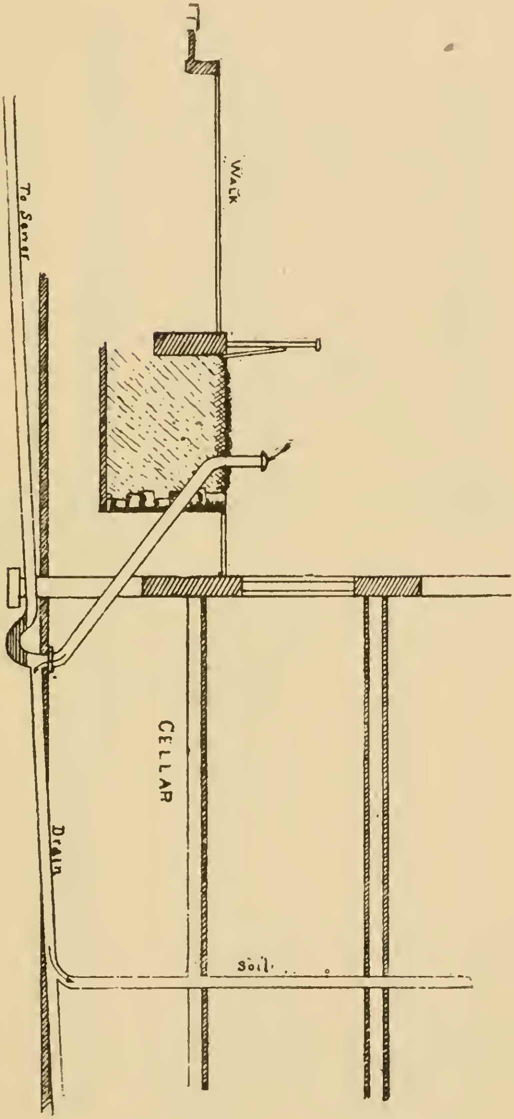


FIG. 12.

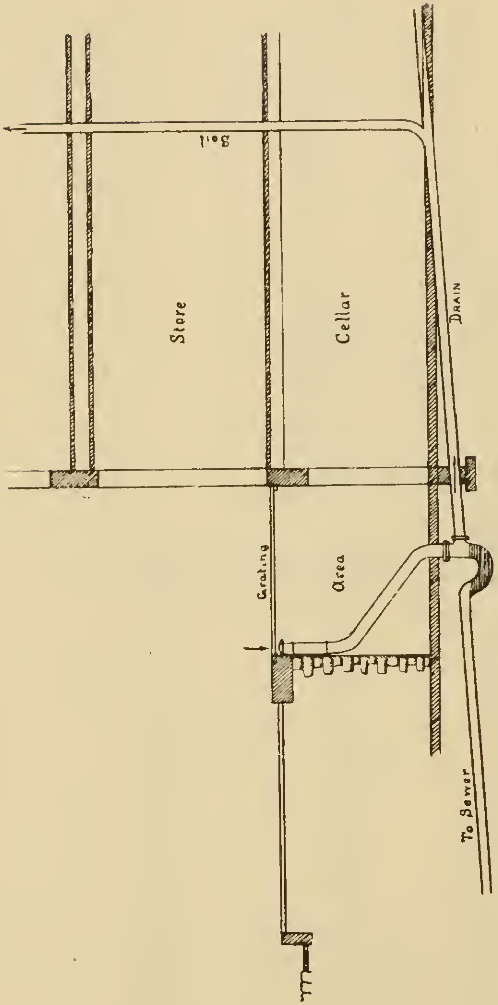


FIG. 13.

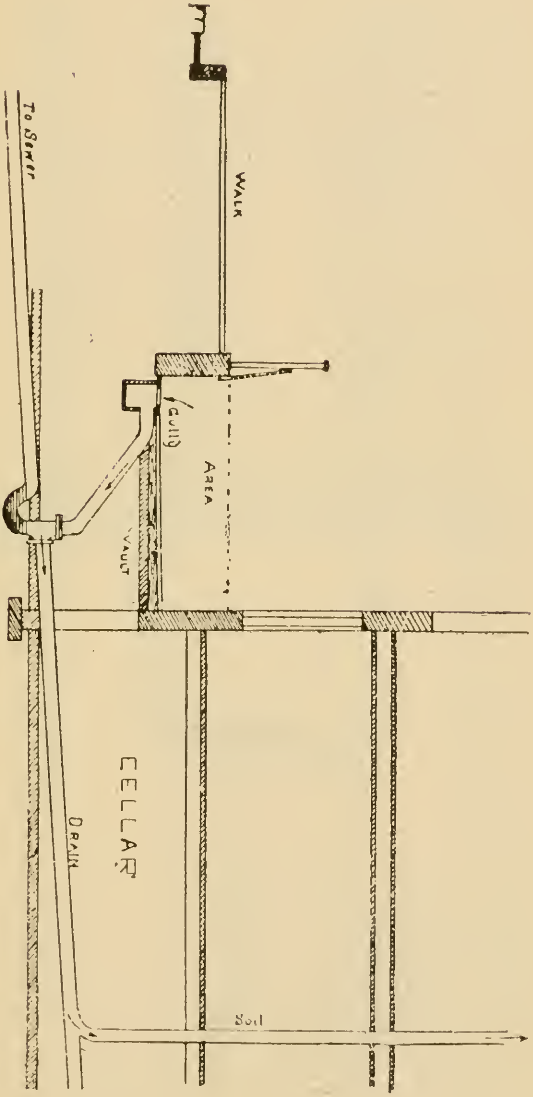


FIG. 14.

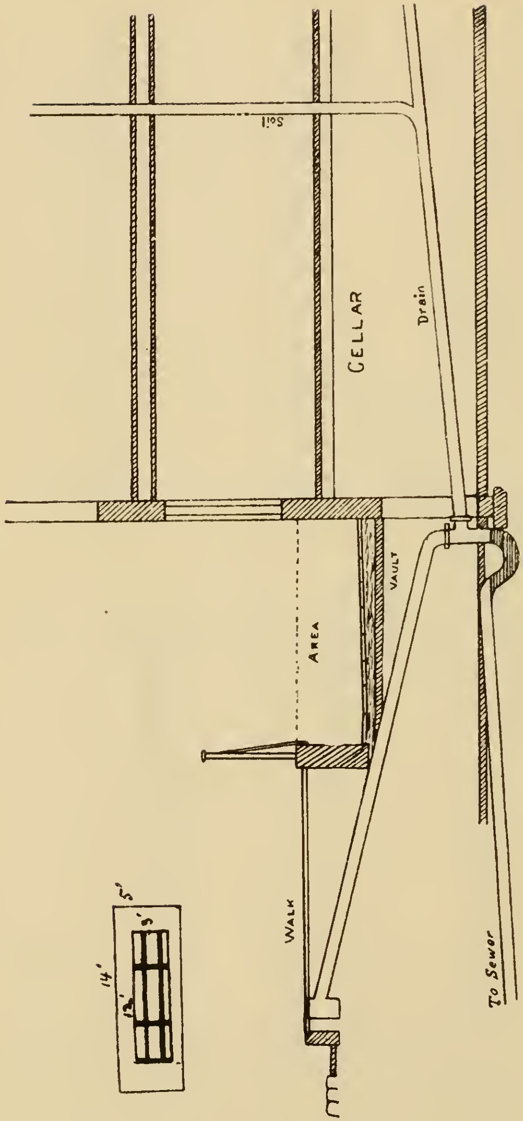


FIG. 15.

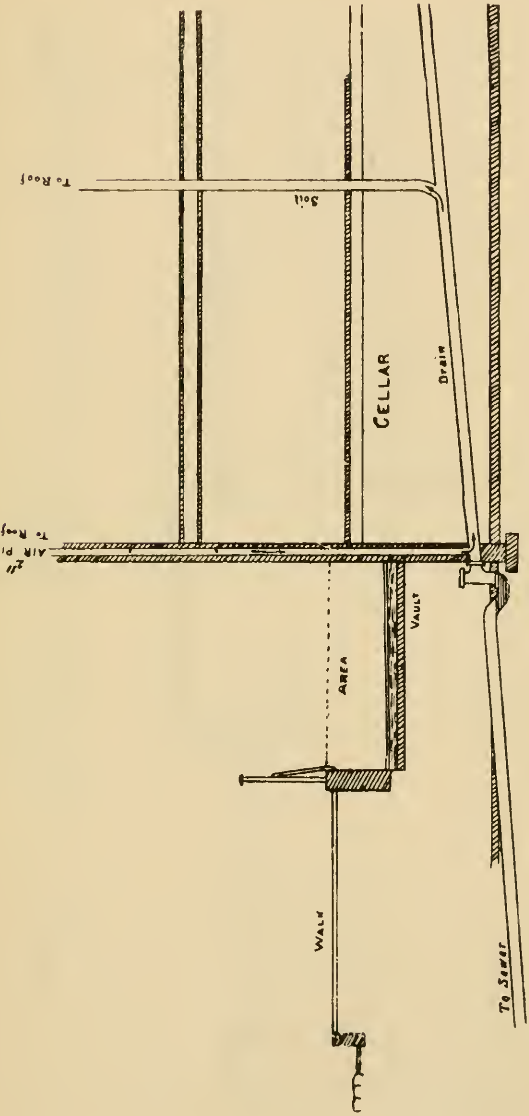

To Roof
Soil
CELLAR
Drain
2"
AIR PIPE
To Roof
Vault
Area
Walk
To Sewer

FIG. 16.

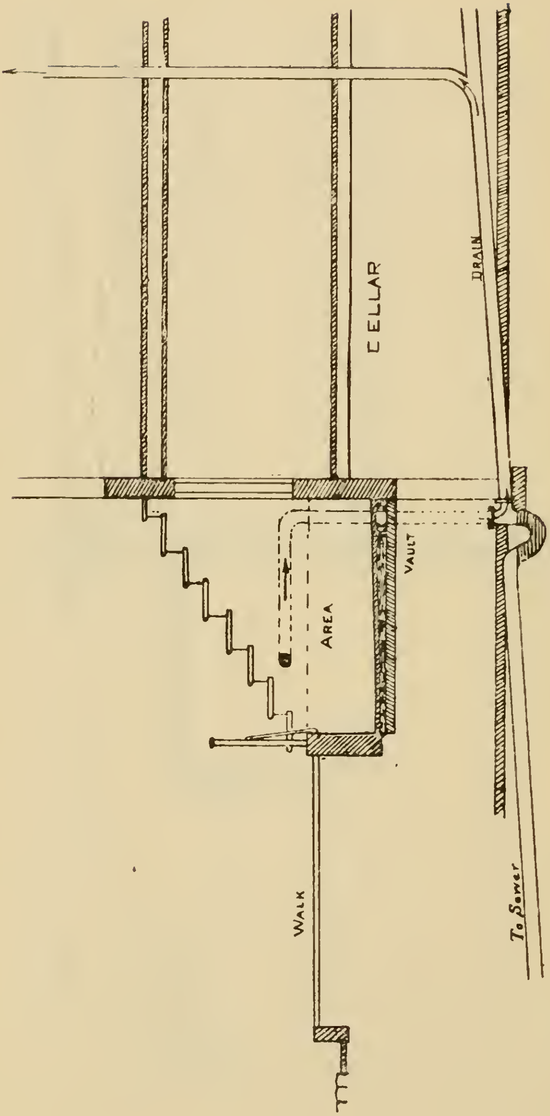


FIG. 17.

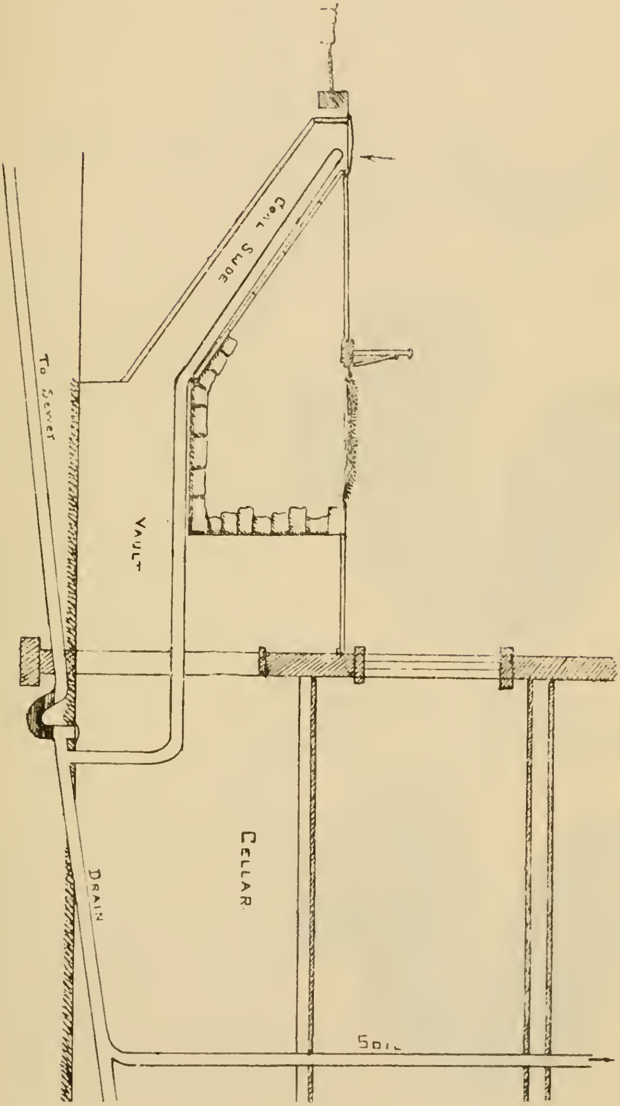


Fig. 18.

TRAP ON MAIN DRAIN.

Our *third* requirement calls for a trap on the main drain between the sewer, cesspool or flush tank and the fresh air pipe. A *trap* is practically a suitable bend or dip in the drain, which retains a sufficient quantity of water to prevent the passage of air or sewer gas from the sewer to the house drain. Fig. 19 shows the common running trap, as manufactured in earthernware. Fig. 20 shows a cast iron trap as manufactured by the J. L. Mott Iron Works, N. Y., with a cleaning and inspection hole at the house side of the waterseal, which serves in some cases, when the trap is placed in a man-hole outside of the house (Fig. 9), covered by an open grating, as a fresh air inlet. In other instances (Fig. 4) a leader is introduced into this opening, and the trap receives abundant flushing at each rain-fall. Sometimes the running trap is located on the line of the iron drain, just inside the house-walls (Fig. 39), so as to be easily accessible and in sight at all times. A trap, such as Fig. 21 illustrates, is then used, having a cleaning hole with a cover. Care should be taken to close this opening perfectly air tight. A combination of trap and fresh air inlet, located outside of the house, is shown in Fig. 22, which is taken from a circular on house drainage of the Massachusetts State Board of Health. Various locations of traps are illustrated in Figs. 10–18. In all cases the trap should be so located as not to be liable to freeze in cold climates or exposed localities.

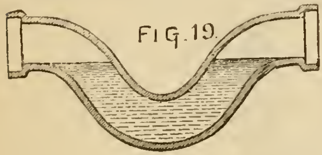


FIG. 19.

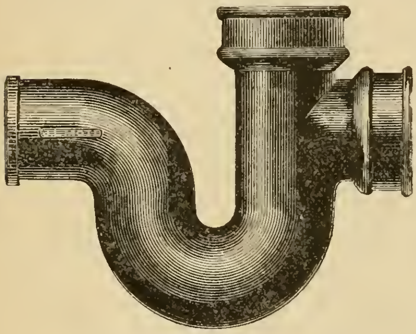


FIG. 20.

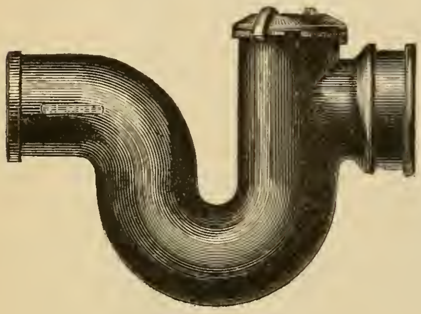


FIG. 21.

Of late the question has been discussed whether this trap on the main drain is necessary and useful or should be omitted. The objec-

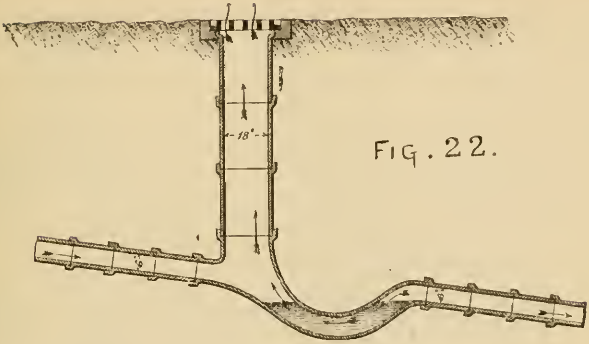


FIG. 22.

tions urged against the use of traps are as follows:

1. They impede the ventilation of the public sewers.

2. They form an obstruction to the flow of the sewage in the house drain, and are, therefore, the cause of accumulations of foul matter in the drain, which by its decomposition will generate noxious gases; also

3. Foul matters will lodge in the trap.

While the first objection does not strictly belong to the subject of this paper, I will say that it is accepted by most authorities that house drains and soil pipes should not be used as ventilators for the street sewers. In exceptional cases — such as, for instance, where an entirely new sewerage system is built, designed and constructed according to uniform plans, and where not only the construction of sewers, but also the house plumbing is under constant supervision of the engineer and designer of the system* — the trap (and consequently the special fresh air pipe) may, perhaps, be left out. But I believe that a proper ventilation of sewers can be effectually carried out without ventilating through the houses.†

In regard to the second and third objections, I would say that obstructions do not frequently occur if the drain is carefully laid, with sufficient and continuous fall to insure a cleansing velocity of the flow. If such an inclination cannot be given to the drain, proper flushing appliances should be used, and these will, certainly, by daily or more frequent washings, insure the removal of all matters liable to lodge in the trap. Another most necessary precaution to prevent accumulations in the trap, where the fall is very slight, may be found in the use of a proper grease-trap, about which I shall speak hereafter.

No amount of care in laying the drain will prevent its obstruction

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*For instance, at Memphis, Tenn., and at Hamburg, Dantzic, Frankfort-on-Main, Berlin, Breslau and other places in Germany.

†See Mr. Edward S. Philbrick's article on "Ventilation of Sewers," in the Sanitary Engineer, Vol. I. See also Sanitary Engineer, Vol. V., Number 12, page 246.

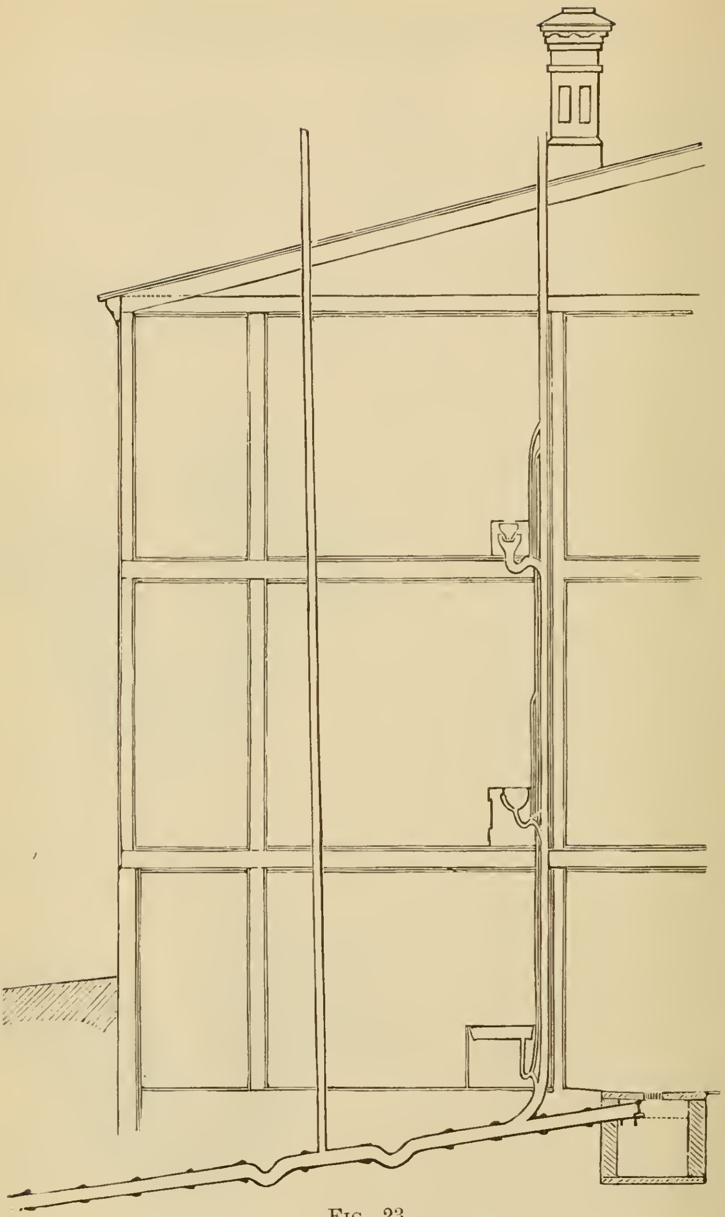

FIG. 23.

through carelessly introduced articles; these will mostly lodge in the trap. A cleaning hole should therefore be provided with the trap. and is rarely omitted in good work, or else a Y branch, closed with a trap-screw, should be inserted just a little above the trap (Fig. 4).

In Vol. III. of the "Sanitary Engineer" will be found a discussion of the advisability of trapping the main drain. My own opinion, as stated in a communication to that journal, is as follows:

"If we could have *ideal* sewers, house drains and soil pipes, it might perhaps be possible to dispense with such a trap altogether. But since all sewers may have temporary stoppages from some cause, since house drains may settle or leak, and joints of soil pipes crack, thus allowing sewage matter to undergo putrefaction and enter the interior of houses, I would in all cases advise the use of a safeguard, consisting in a disconnecting trap and a *well ventilated soil pipe.* This latter arrangement is a *conditio sine qua non,* and rather than have a trap *without* ventilation I would advise to have none at all. . . . . I would always condemn as unsafe a system of house drainage in which the public sewers are ventilated through the houses. . . . . The work of ventilating public sewers should, in my opinion, be done by the same public authorities who devise the sewer system, and not by the householders."

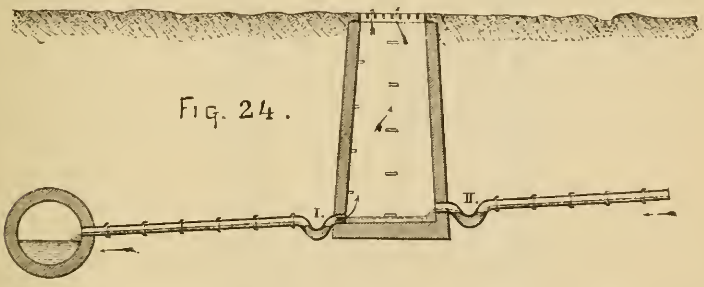
Fig. 24.

Leaving aside, however, the case of a house drain connecting with a public sewer, it seems quite evident that, in the case of a house discharging its sewage into a cesspool, an effective barrier should be imposed to the gases constantly generated in that receiver of all foulness from the household; and equally so in the case of a flush tank which temporarily holds a large amount of fæcal and other refuse matter, which sometimes undergoes decomposition.

In those exceptional localities where undue pressure in the sewer — from wind blowing into the outlet of the sewer, or from sudden changes of temperature (when exhaust steam is allowed to enter a sewer), or from heavy accumulations of surface waters gorging the sewer, or from the action of the tide in tide-locked sewers—frequently forces the seal of the trap, two running traps with a proper vent pipe between them may be used. In such a case, however, the fresh air pipe should enter the house drain above the upper trap. The arrangement shown in Fig. 23 is therefore not a safe one, as no fresh air pipe enters the soil pipe at its foot. Fig. 24 shows an arrangement

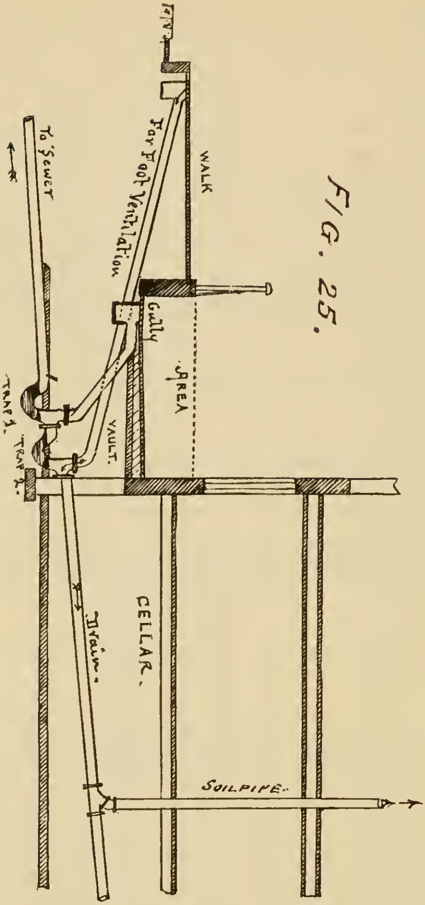

FIG. 25.

of two traps on the line of the drain, with an open channel at the bottom of a man-hole between the traps, which is sometimes adopted when the sewer is located in an alley at the rear of the house. Fig. 25 shows the arrangement of a double trap and fresh air pipe when the sewer is in front of the house.*

TRAPPING OF FIXTURES.

The *fourth* essential, as stated above, calls for a suitable trap, placed as near as possible under every fixture. These traps become a necessity, since much of the so-called "sewer gas" is actually generated in the very drains and soil pipes of the house. The trapping of the main drain would prove ineffective, and would offer no protection whatever against the foul gases derived from organic matter decomposing within the pipes.

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*Proposed by Walter G. Elliot, C. E., in the Sanitary Engineer, Vol. III.

Traps should be located as close as possible to fixtures, in order to reduce the length of waste pipe on the house side of the trap, which is liable to become foul with long use. Probably the best material for traps is lead, as this permits of making a good joint with the lead waste-pipes. As Mr. Hellyer has truly pointed out, the junction of the trap with the waste pipe is of far more importance than its junction with the fitting, because the former is on the sewer side of the trap, and, unless properly made, would afford a passage for gases from the waste pipe system into the rooms.

Whatever kind of trap may be used under fittings (and there is an endless number of such patented devices), it is of the greatest importance that the trap should be *self-cleansing;* for this reason traps with square corners or large spaces, liable to accumulate dirty matter, are objectionable. Much depends on a proper size of traps for waste pipes: the smaller the trap the better will it be washed clean. As a good rule I would recommend to choose a trap a quarter or half an inch smaller than the diameter of the waste pipe, to which it is attached. The flushing stream is thus concentrated, and its scouring power increased within the trap, while on the other hand a trap an inch larger than the waste pipe is sure to fill up in time with sediment.

The following will serve as a guide:

Traps under water-closets with 4in. soil pipe should be 3½in. to 4in. diameter.

Traps under wash-basins with 1¼in. to 1½in. waste pipe should be 1in. to 1¼in. diameter.

Traps under bath- and foot-tubs with 1½in. waste pipe should be 1¼in. diameter.

Traps under laundry-tubs with 1½in. to 2in. waste pipe should be 1¼in. to 1½in. diameter.

Traps under sinks with 1½in. to 2in. waste pipe should be 1¼in. to 1½in. diameter.

Traps under slop sinks with 2in. to 3in. waste pipes should be 1½in. to 2in. diameter.

As regards the proper dip of traps I would say that traps under those fittings which receive solids (water-closets) should not have a greater dip than 1½ to 2 inches, because otherwise the solids are not readily removed, and lodge in the trap. For traps of minor wastes a larger dip or "water-seal" is advantageous, as affording a protection against loss of seal through evaporation, siphonage or back pressure.

Traps may be classified according to the means used for the exclusion of gases into:

1. *Water-seal traps,* 2. *Mechanical traps.*

The characteristic of all water-seal traps is that they have in their lowest part a bulk of water divided by a dip in the pipe, so as to stand on the house side as well as on the sewer side one or several inches higher than the lowest point of the dip, thus making a seal which, under ordinary circumstances, prevents the passage of gases.

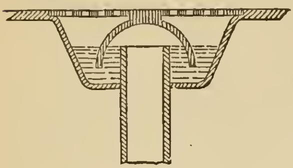


Fig. 26.

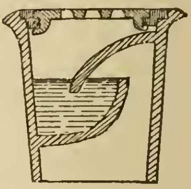


FIG. 27.

The traps of the second class have, in addition to the water-seal, a mechanical contrivance such as floats, balls, valves, flaps, etc., to exclude sewer gas.

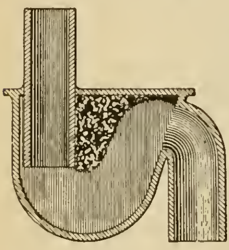


Fig. 28.

Among the water-seal traps I mention the old fashioned D trap, the bell trap, Antill's trap, Adee's trap, the bottle trap, the common S trap, half and three-quarter S traps, etc. There is an endless variety of mechanical traps, amongst which I mention Bower's trap, Cudell's trap, Garland's trap, Waring's check-valve, Buchan's trap, Nicholson's mercury-seal trap and others.

The bell trap (Fig. 26) is objectionable on account of insufficient water-seal and improper shape. It is frequently found at the outlet of sinks, and, being in its upper part a strainer, it is often removed by servants or thoughtless persons, and the gases from the drain-pipe then freely enter the house.

Antill's trap (Fig. 27) avoids this defect, having a *fixed* strainer, but is objectionable on account of shape and small water-seal.

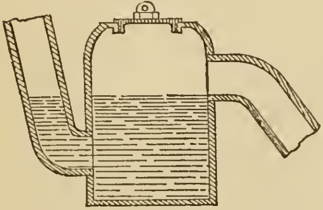


Fig. 29.

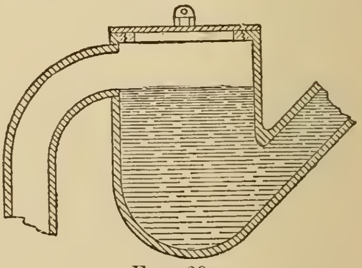


Fig. 29a.

The D trap (Fig. 28) and the bottle trap (Fig. 29) constitute small cesspools; they violate the principle that a trap ought to be self-cleansing. The D trap accumulates dirt and grease in the upper corner (see Fig. 28), which receives no scouring from the water passing through the trap; and the bottle trap very often chokes up as shown in Fig. 30. Both traps are then practically S traps. Fig. 29a illustrates a bottle trap of improved shape, which may keep cleaner on account of its round bottom. Adee's traps (Fig. 31) are little better in this respect, though they have this to recommend them, that they are not easily siphoned, having a large air space above the water, and a large body of water in the trap.

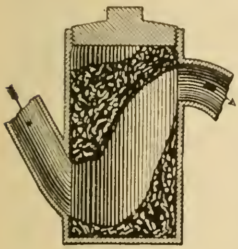


Fig. 30.

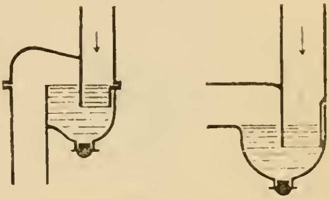


Fig. 31.

The S traps and half S traps (see Fig. 32) are shaped so as to be self-cleansing, being of uniform diameter throughout, and having no nooks or corners. They fail sometimes by siphonage, or by evaporation of the water.

Bower's trap is shown in Fig. 33. This trap has a water-chamber into which the pipe from fitting enters at the center, and an outlet pipe on one side. The mouth of the inlet pipe is sealed by the water in the chamber, but in addition to this a floating ball of India rubber in the water-chamber is held tightly against the mouth of the inlet pipe, forming a seal, which, however, depends on the quantity of water in the chamber. The water, in passing through this trap, removes the ball from its seat and rotates the same, thus keeping it clean and free from matters adhering to it. An additional advantage of this trap lies in the ball, which, being compressible, allows the water in the chamber to freeze without danger of the bursting of the cup. Unless the soil pipe is extended full size through the roof this trap may have its water lowered by siphonage so much that the ball will drop from the mouth of the inlet pipe, but with proper ventilation of soil and waste pipes it forms an efficient trap for wash-bowls, tubs and sinks.

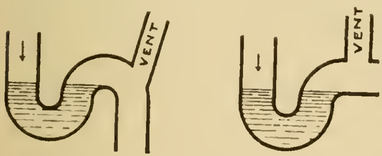


Fig. 32.

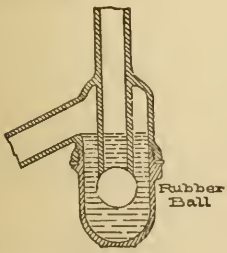


Fig. 33.

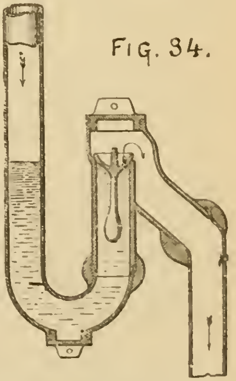
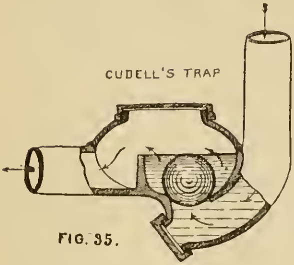


FIG. 34.

Waring's check-valve is shown in Fig. 34. This valve forms a seal by its weight, and the seal is dependent upon the accuracy of the turned seat. Hair and particles of other matters may adhere to it and prevent a tight shutting of the valve.



CUDELL'S TRAP

FIG. 35.

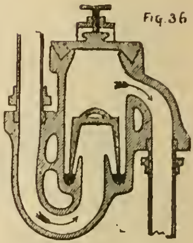


Fig.36

Cudell's trap (Fig. 35) is constructed much upon the same principle, but has a heavy metallic ball instead of a conical shaped valve. This ball may keep cleaner by being revolved, but in this case, as above, the tightness of the seal will depend upon the accuracy of turning the seat.

Nicholson's mercury seal trap (Fig. 36) has an inverted porcelain cup inside of its cylinder, the edge of which rests on mercury, forming a tight seal. The cup is lifted, at each discharge, by the force of the water entering at bottom of cylinder; after all water has passed from the basin the cup falls back in its place. This trap is generally made of earthenware with brass couplings; it is therefore a more expensive trap, but the mercury seal very efficiently prevents the entrance of sewer air, even if the water in the cylinder should be removed by siphonage or evaporation.

VENTING OF TRAPS.

The *fifth* requirement asks for a proper vent pipe for such water-seal traps as are liable to be siphoned. This siphonage constitutes in many cases a danger, especially so with S traps. Traps may be siphoned under the following conditions:

1. Traps with an easy bend, on a rather steep line of waste pipe, and with small seal, are liable to empty themselves by the momentum of the water rushing from the fitting through them. The air in the upper bend of the trap is expelled and replaced by water, which causes the trap to act as a siphon. When the fitting has discharged all its water, and air breaks the siphon, the water in its inner limb will mostly drop back into the trap, but in case of a small dip it would be insufficient to seal the trap. Unless a slow after-flush takes place the trap remains unsealed.

2. Traps under fixtures may be siphoned by water coming from another fitting on the same waste pipe.

3. Traps may be siphoned by a discharge — from a water-closet, a tub, or from a pail of water from a slop sink — into the main soil pipe, to which the branch waste of the trap is connected.

To guard against the *first* danger the dip or water-seal of the trap should be as great as possible; but, even then a special vent-pipe will often be necessary, attached to the highest part of the bend in the trap on the sewer side of the water-seal (Fig. 32), or else a mechanical trap should be used.

To guard against the *second* danger the S trap should be vented, or a mechanical trap should be used; wherever possible, each fixture should discharge independently into the soil pipe, thus reducing the danger from siphonage to case 1 and 3.

The *third* danger from siphonage by a discharge into the main soil pipe, either above or below the point, where the waste from the trap enters it, will in some cases be sufficiently prevented by the complete and thorough ventilation of the soil-pipe [see requirement 1 and 2, page 276 and page 279]. In other cases the venting of the trap becomes necessary.*

Where a number of water-closets discharge into the same inclined branch of a soil pipe the air-vent to the water-closet trap becomes necessary, especially so with water-closets, discharging quickly a large body of water, such as the various patterns of the plunger-closets (Zane, Demarest, Jennings) and some of the "washout" closets.

It is often not only costly but also inconvenient to run vent pipes to the roof. I am, therefore, inclined to prefer a good mechanical trap which cannot be siphoned provided the soil and waste pipe system has ample ventilation. Such a trap may be used under sinks, tubs and bowls. But for water-closets and slop-hoppers without a strainer the simple lead water-seal trap, vented wherever necessary, is the only safe device.

The material most suitable for air-pipes is lead, as such pipes are easily joined to lead traps. Sometimes wrought-iron tubing is used, and, since the vent pipe is not so much intended for carrying off foul gases [which office is performed by the vertical extension of all waste pipes through the roof] as to afford a passage to air in order to break the suction, they may be safely used. Care should be taken to lay these pipes with a slight inclination, in order to prevent accumulation of water from condensation in the pipes. Vent pipes for fixtures on different floors may be joined, if convenient, and may enter the soil pipe above the highest fixture (Fig. 37). But it is preferable to run

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* The writer was lately engaged in making, under direction of Col. Geo. E. Waring, Jr., a very complete and interesting series of experiments upon the siphonage of traps, for the National Board of Health. He much regrets not being at liberty to refer to these experiments, as the official report upon them has not yet been published by the National Board of Health.

WM. PAUL GERHARD.

NEWPORT, R. I., February 6th, 1882.

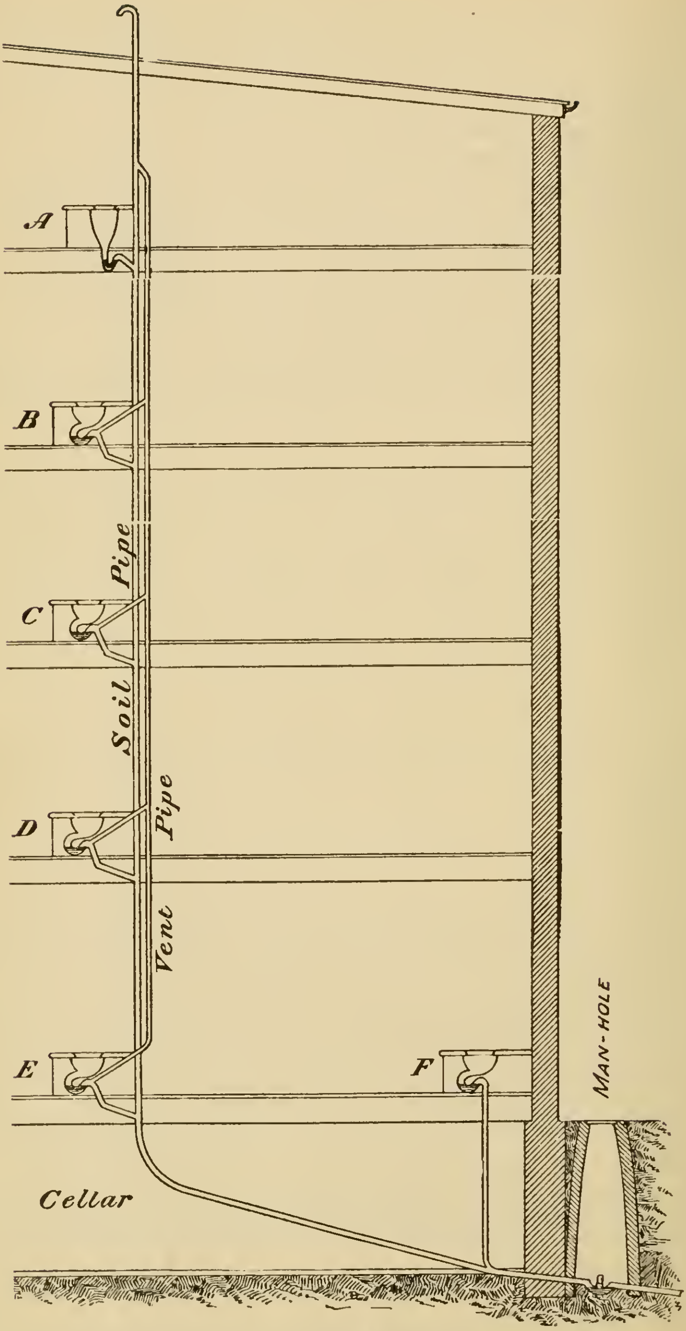

FIG. 37.

them through the roof independently. Where they pass through the roof they must be enlarged to pipes of 4 inches diameter, as they might otherwise be obstructed by ice in winter time. They should not be covered at the top with any kind of ventilator. The size of the vent pipe should never be less than that of the trap, except for water-closet traps, where it should be 2 inches in diameter, but in the case of two or more water-closets it should be 3 inches and sometimes even larger from the point where the various vent pipes join.

I must here make mention of the apparent danger of these vent pipes on traps under tubs, sinks and bowls stopping up with soap-suds or grease, in which case they would cease to act properly. This might prove another reason against the use of such vent pipes, but, these vent pipes being a comparatively recent refinement of plumbing, little is yet known about this point.

EVAPORATION OF WATER IN TRAPS.

Nothing short of continuous use will prevent evaporation of the water in traps. A large dip is recommended for traps on waste pipes to guard against a rapid loss of the seal. The vent pipe on traps will tend to increase this evaporation by the continuous current of air through it. When a house will be left unoccupied for a long time, but especially during the hot summer months special precautions should be taken to prevent sewer gas from entering the rooms and saturating carpets, wall-papers and furniture. Replacing the water in traps with oil or glycerine may be recommended.*

ABSORPTION OF GASES BY THE WATER IN TRAPS.

It is well known that water has the property of absorbing gases, and it was believed that the water in traps would readily absorb sewer air from the soil pipe and give it off at the house side of the trap by evaporation. It has also been asserted that microscopic organisms (germs of disease) floating in gases of decay would pass through the dip of the water-seal and enter the house through the fixtures, and that consequently the water-seal of traps offered no security against the invasion of sewer gas. Dr. Fergus, of Glasgow, England, was the first to call attention to this matter, and made an extensive series of experiments in 1873–74, which led him to condemn as unsafe the system of water carriage in general, and the trapping of fixtures. The views of sanitarians, based upon Dr. Fergus' experiments, have been much modified by recent experiments of Dr. Carmichael, of Glasgow, by researches of Dr. Frankland in London, Wernich and Naegeli in Germany, Prof. Rafael Pumpelly and Prof. Smyth in Newport, R. I., and others.

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*See article in American Architect, 1880, on "How to leave plumbing for the summer."

Dr. Fergus' experiments were made with gases in a concentrated condition, and as such are quite as reliable as the more recent experiments. But the latter more closely resemble actual cases, being made by experimenting directly with soil pipe gases. Referring to what has been said (page 258) about sewer gas, it will be seen that ammonia, sulphuretted hydrogen and other gases of decay are present in drains and soil pipes only in minute quantities. Dr. Carmichael found that the amount of these gases passing through a water-seal trap was so extremely small that no danger could be apprehended. With a thoroughly ventilated system of soil and waste pipes this peril may be taken as insignificant.

Another set of experiments by Dr. Carmichael, made to determine the passage of germs through water, seems to indicate that germs, even if contained in the water of traps, are not liberated from it, as was hitherto supposed, unless the water is violently agitated. Frankland in England, Naegeli in Germany and Prof. Pumpelly in Newport, R. I., arrived at the same conclusion, after careful investigations and experiments.

Dr. Carmichael sums up his conclusions by saying: "Water-traps are, therefore, for the purpose for which they are employed, that is, for the exclusion from houses of injurious substances contained in the soil pipe, perfectly trustworthy. They exclude the soil pipe atmosphere to such an extent that what escapes through the water is so little in amount, and so purified by filtration, as to be perfectly harmless; and they exclude entirely all germs and particles, including, without doubt, the specific germs or contagia of disease. . . . ." Further scientific researches will undoubtedly throw more light on this yet little investigated subject.

TRAPS FORCED BY BACK PRESSURE.

On page 280 it was explained how traps under fixtures may be forced by back pressure. This cannot, however, occur with traps under fixtures, if all soil pipes and waste pipes are properly extended through the roof, and provided with a fresh air inlet at the foot of soil pipes.

If all the above given rules are carefully observed, the system of drainage of a dwelling will be as perfectly as possible in accordance with the present knowledge of sanitary science. Time and experience

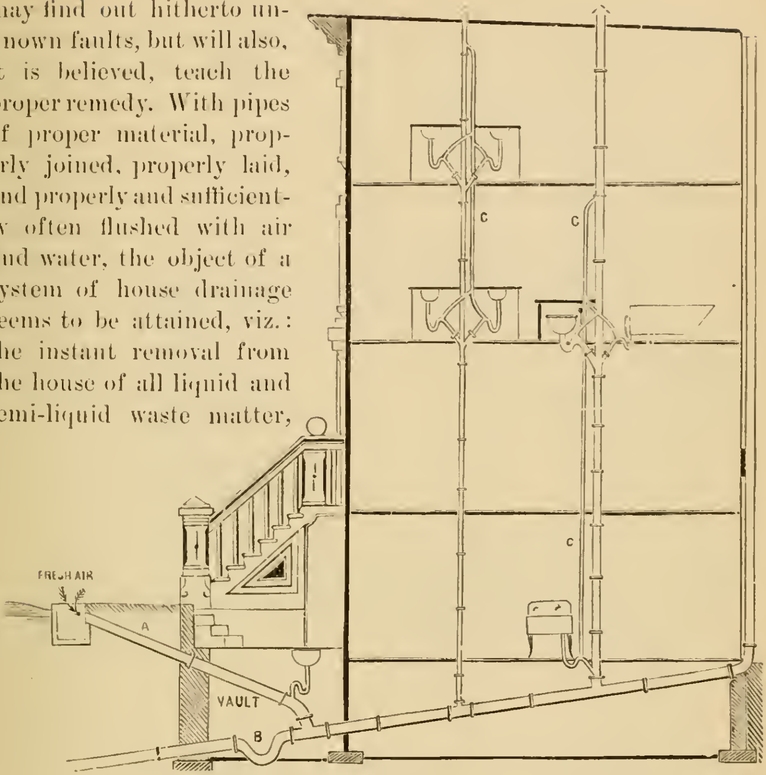

Fig. 38.

may find out hitherto unknown faults, but will also, it is believed, teach the proper remedy. With pipes of proper material, properly joined, properly laid, and properly and sufficiently often flushed with air and water, the object of a system of house drainage seems to be attained, viz.: the instant removal from the house of all liquid and semi-liquid waste matter, and the perfect oxydation and constant dilution of the air contained in the pipes.

Says Mr. J. C. Bayles*: "The conclusion I have reached is that when sewer gas finds its way into a house through the soil and waste pipes, the fault lies somewhere between the architect, the builder and the plumber. In any case it is without excuse. I know that houses can be drained into sewers — without bringing sewer gas into them. The existence of foul sewers is in itself a perpetual danger to the public health, but there is no reason why we should bring that danger into our houses by providing channels through which the poisonous air of the sewer can find a means of ingress. I know of houses into which no sewer gas ever comes — unless, possibly, through the windows, borne in with the air of the street — and I have no hesitation in saying that, when the tenants of houses demand immunity from the dangers of unhealthful conditions, architects and builders will find a means of correcting the evils now complained of

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*J. C. Bayles, House drainage and water service.

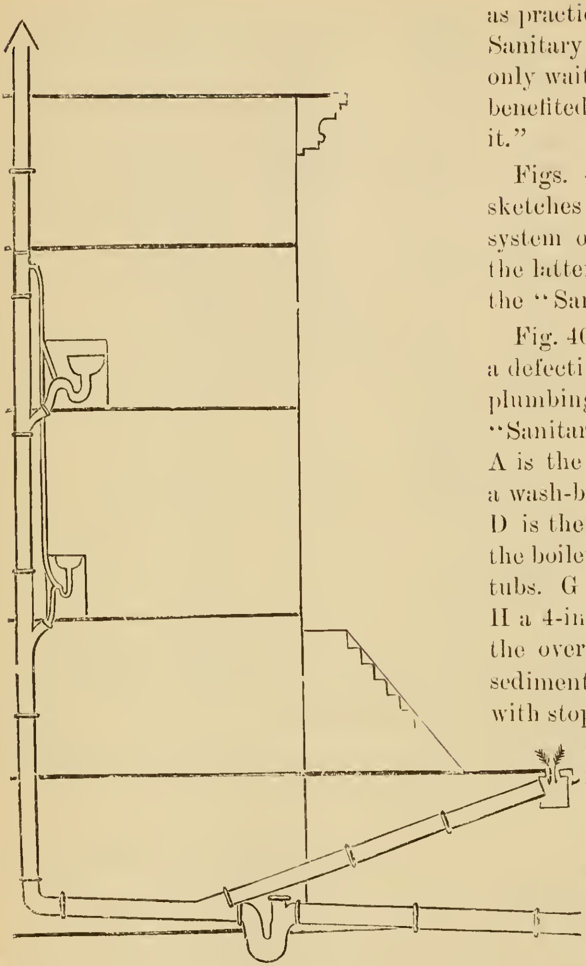

Fig. 39.

as practically irremediable. Sanitary reform in cities only waits until those to be benefited by it shall demand it.”

Figs. 4, 38 and 39 are sketches of a well devised system of house drainage, the latter two proposed by the “Sanitary Engineer.”

Fig. 40 shows a sketch of a defective arrangement of plumbing, taken from the “Sanitary Engineer,” Vol. I. A is the supply tank, B is a wash-basin, C a bath-tub; D is the water-closet; E is the boiler, FF are the wash-tubs. G is the kitchen sink, H a 4-inch soil pipe. *a* is the overflow pipe, *b* is the sediment pipe of the tank, with stopcock; 1 is the trap of the water-closet, 2 is the trap of the kitchen sink.

The defects are as follows: 1. The soil pipe is not extended full size through the roof, is not trapped where it goes to cesspool, and has no fresh air pipe.

2. The wash-bowl, bath-tub and the wash-tubs have no separate traps, but deliver into the trap of the water-closet and of the kitchen sink respectively.

3. The soil pipe not being extended, these traps will be siphoned, as they have no air vent.

4. The overflow from tank is connected to the soil pipe; it is trapped, but the water of the trap will soon evaporate, and the soil pipe air will taint the water in the tank.

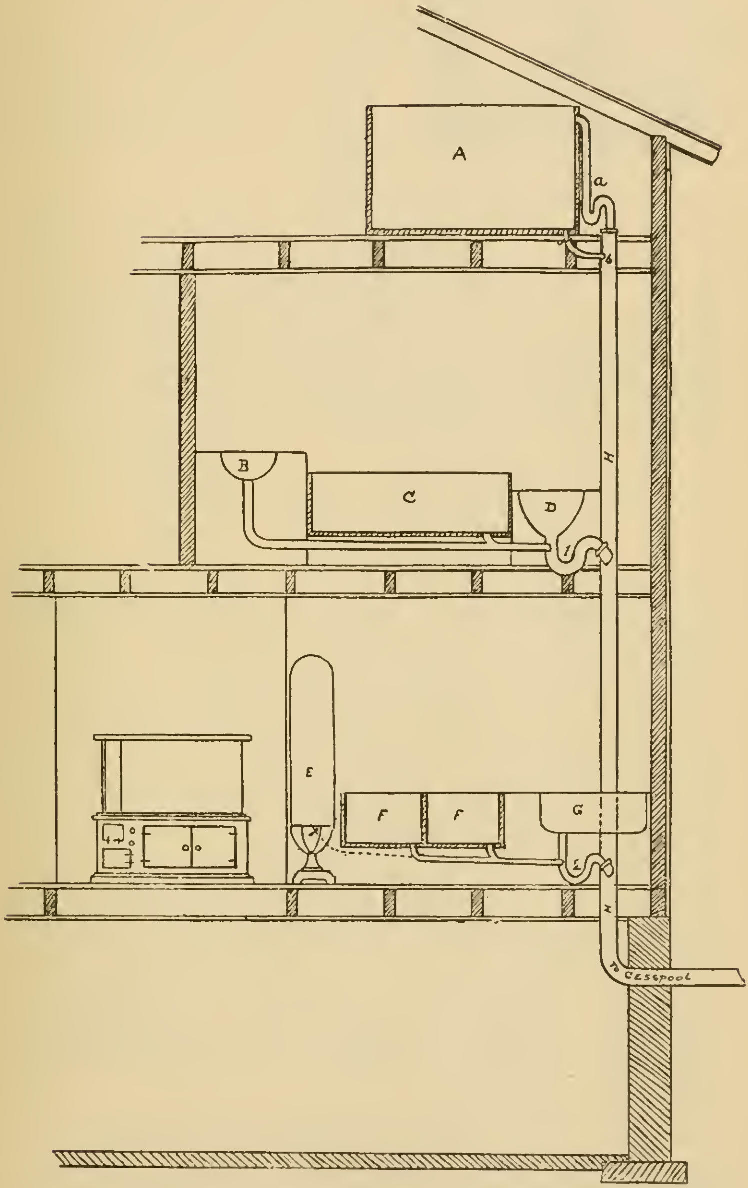

FIG. 40.

5. The blow-off from the tank is in communication with the soil pipe.

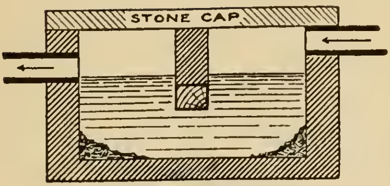

FIG. 41.

Fig. 41 illustrates a most defective manner of trapping the house drain, by the so-called "cesspool trap. It requires no vivid imagination to see in how short a time this trap really becomes a *cesspool.**

RECORD AND PLAN OF DRAINAGE AND PLUMBING INSPECTION.

It cannot be too strongly recommended to every householder to keep for future reference, for cases of inspection or repairs and alterations, a complete plan of all the drain, soil and waste pipes in and outside of the house, a record of the depth of the drain, of the sizes and material of pipes, of the location of junctions, traps, fresh air pipes, access-pipes or cleaning Y's, of all fixtures on every floor, etc. Such frequent inspections are by no means superfluous. In some cities "sanitary associations" have been organized, such as at Newport, R. I., Lynn, Mass., and other places. The members of these associations can avail themselves of the services of an inspector of plumbing, employed by the association, in order to assure themselves by frequent inspections of the sanitary condition of the plumbing in the house, of its outside drainage and water supply, its ventilation, etc. In the case of new buildings the architect's plans should show the exact location of the proposed plumbing work in the house. The work should be done according to written specifications, carefully drawn up by the architect or a sanitary engineer, under whose immediate direction the plumber should work. It is a mistake—but, alas! how often is it made—to give the plumbing work of a new building out by contract. The slight amount saved in first expense is almost always followed by an increased outlay for repairing and altering defects, which appear only after the house is occupied. A prudent house owner will prefer to have his plumbing done by day labor, by honest, conscientious plumbers—and these are by no means rare, as the universal cry against them would seem to indicate,—who care more about their reputation than about a few dollars earned through dishonest and reckless work.

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*It seems impossible, without exceeding the limits of this paper, to point out even the most frequent defects in house drainage. For an interesting account of these I refer the reader to

T. Pridgin Teale, dangers to health, a pictorial guide to domestic sanitary defects, 70 plates, 3d edition, Philadelphia.

See also: Col. Geo. E. Waring, Jr., the sanitary condition of New York City, in Scribner's Magazine for May, 1881, pages 73–75; 7th annual report of the State Board of Health of Massachusetts, Defects in House Drainage and their remedies, by Edw. S. Philbrick, C. E.: 10th annual report of the Massachusetts State Board of Health; Common defects in house drains, by Eliot C. Clarke, C, E.; Dr. John Simon's admirable book, "Filth Diseases and their Prevention," American edition, paragraphs 14–20, 30–32; and the "Sanitary Engineer," vol. 1–5.

PLUMBING REGULATIONS.

The cities of New York, Brooklyn and Washington lately have set an example worthy of imitation in other cities. The health authorities have issued excellent regulations for plumbing of buildings, and require the plans for plumbing to be submitted to them for approval and for filing. The plumbing, before being covered up, is examined by intelligent inspectors of the Board of Health. There may be at first some bad feeling about such a measure, but the good plumber will soon understand that the law passed is to his advantage: it will protect him against "botches" in the trade, and will help to reëstablish his of late much abused good name.

These plumbing regulations will certainly tend to lessen the frequent complaint about bad plumbing in houses, and the consequent entrance of sewer gas. They will contribute much towards the lowering of a high death rate, and similar regulations may be adopted with advantage in all large cities.

PLUMBING FIXTURES.*

I will now consider the selection of proper plumbing fixtures. Of these I shall briefly discuss wash-basins, baths and foot-tubs, laundry tubs, kitchen and pantry sinks, greasetraps, housemaid's sinks, slop sinks, urinals, water-closets and flush tanks; also tanks, cisterns and refrigerators, so far as they are connected with the drainage of the dwelling. It may be well to say here that the fixtures in a house should be so concentrated as to render necessary as few vertical stacks of soil or waste pipes as possible, and also to avoid long, horizontal runs of soil and waste pipes, which are objectionable inside floors, first, because they often necessitate the cutting of beams, and second, because they exclude the possibility of laying the soil and waste pipes with a sufficient pitch. Much may be effected in planning a new building, in this direction, by a proper attention of architects to its drainage system.

In regard to proper sizes of waste pipes and traps for fixtures see page 295. In all cases place the traps for fixtures as near to them as possible.

WASH-BASINS.

Beginning with wash-basins little of sanitary importance may be said with regard to them. If properly fitted with waste pipes of proper size and material, and efficiently protected by a good trap, they may be considered perfectly safe conveniences in dressing-rooms. I would, however, discourage their use in sleeping apartments, as the human system seems to be more susceptible to the influence of sewer gas at periods of rest. The material of which wash-basins are made, is either galvanized or enamelled iron, or else earthen ware, the latter being much the best. The common chain and plug arrangement of wash-bowls is objectionable, as it is liable to become unclean with soap-suds. A good device for emptying a bowl is what is known as "Weaver's waste" (Fig. 42.) By simply touching a knob, connected to a lever, the stopper

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*This review of plumbing fixtures is written from a sanitary point of view only; for a more detailed technical description I must refer the reader to an interesting series of articles on "Modern Plumbing," by T. M. Clark, published in the "American Architect," for 1878; and to the papers on "Plumbing Practice," in the "Sanitary Engineer."

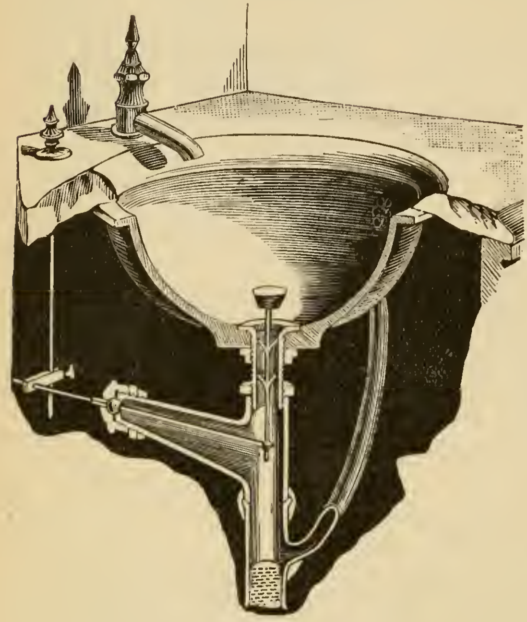
Fig. 42.

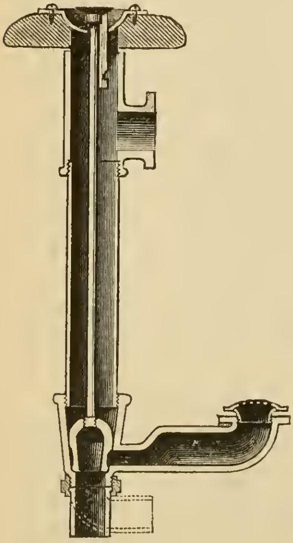
Fig. 43.

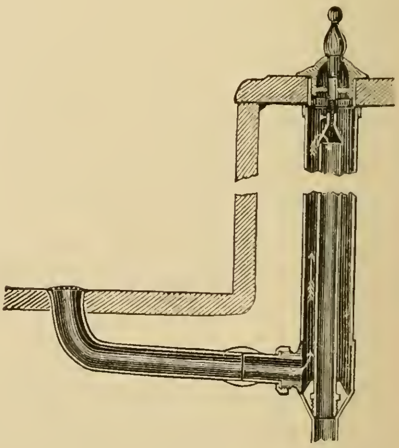
Fig. 44.

in the bottom of the bowl is lifted and held in place. Thus the bowl is emptied without the necessity of putting the hands into the dirty water.*

McFarland's waste, (Fig. 43,†) is a similar good contrivance, but the arrangement shown in Fig. 44,† known as Foley's valve seems objectionable, as it leaves the valve chamber in connection with the bowl, and thus, after emptying the bowl, the chamber remains fouled with soap-suds and deposit, which will mingle with the clean water at the next use of the wash bowl. Jenning's "tip up basins" also do away with chain and plug, and the basin is emptied by tilting it, thus discharging its contents into a bowl underneath which is concentric with the upper basin, and to which the trapped waste is attached. It appears at first sight to be a cleanly device; but it gradually accumulates foulness in the lower basin, which receives no special cleansing, and for this reason these tip up basins are not to be recommended.

If a waste from a wash-bowl is near a soil pipe, it should be made to enter it independently by a 4 x 2 inch Y branch; in no case should it empty into a water-closet trap below the water line. The waste having then only a slight fall from the bowl to the trap, the water of the latter, which frequently holds excremental matter, will stand for a long distance back in the horizontal waste pipe, and keep it continually foul (Fig. 45); the free flow from the bowl is much retarded, and when the waste from bowl has a trap, the pipe between both traps will be air bound. When the wastes from wash-bowls and bath-tubs are not trapped separately but enter the water-closet trap below its water line, which thus is intended to trap both fixtures, the foul water of the water-closet trap may readily evaporate into the room. Moreover, it frequently happens that this trap may become displaced

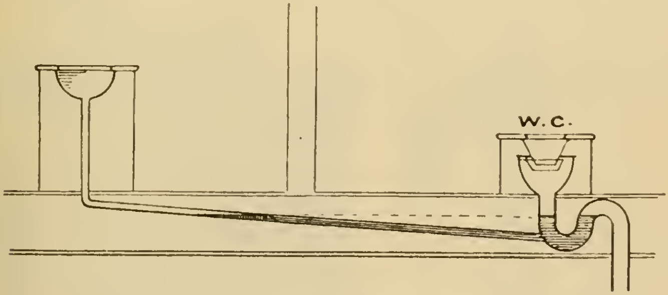

FIG. 45.

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*How disagreeable and contrary to the feelings of cleanliness is it to have to remove a plug detached from its chain from a bowl, used by some unknown person before us, in a public place, ho tel, etc.

†The illustrations sho wMcFarland's and Foley's wastes for bath-tubs; the fittings for wash-bowls are very similar.

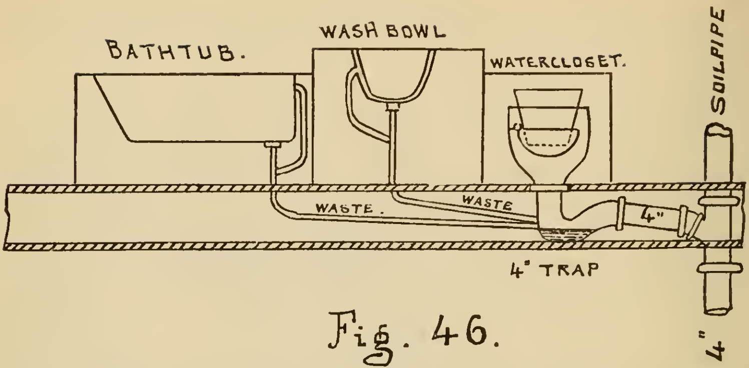

Fig. 46.

so as to render the water-seal, which is usually only a little over an inch in depth, ineffective (Fig. 46.) It will be readily understood how, under such circumstances the foul gases of the soil pipe—especially if this be unventilated—gain an easy access into our rooms. Should the main drain have an untrapped connection to a sewer or cesspool, the gases from these would ascend and permeate the whole building. Such instances of faulty work are by no means rare, and are the causes of much preventable headache and sickness.

BATH-TUBS.

These are made either of heavy copper, tinned and planished, or of

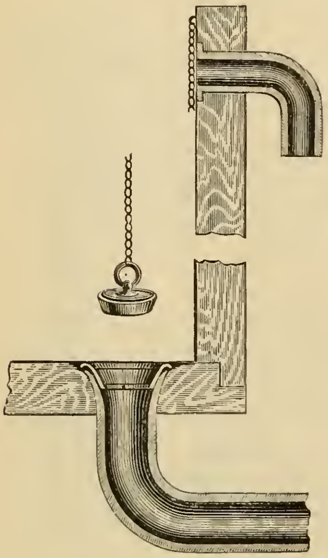

Fig. 47.

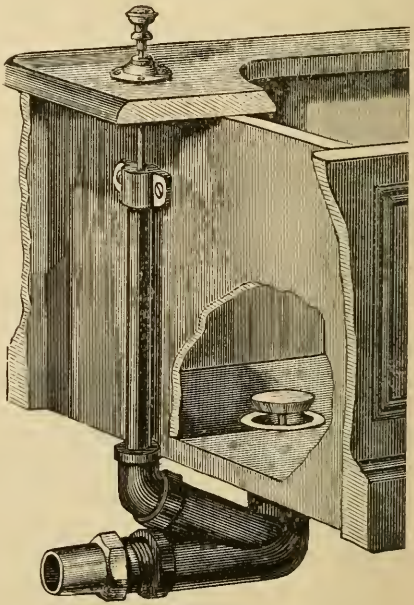

Fig. 47. *a.*

cast iron with a porcelain enamel, or of stone ware. Any of these may be used, the selection depending merely upon their cost. Much of what has been said about wash bowl wastes is equally applicable to bath-tub wastes. They should never enter the trap of a water-closet below its water line, but should be separately trapped. Each bath should be provided with a proper overflow waste, and this should invariably enter the bath waste between the outlet of bath and the trap.* The common arrangement of emptying a bath by chain and plug is shown in Fig. 47. Instead of this uncleanly device an improved bath waste is recommended, for instance Weaver's bath-tub waste (Fig.47ª), McFarland's waste for bath-tubs (Fig. 43), or H. C. Meyer's improved bath waste. What is known as a "standing overflow," (Fig. 48), is a simple and cleanly contrivance for emptying baths, the only objection sometimes made against it being that it may be in the way when bathing. It renders a special overflow pipe unnecessary.

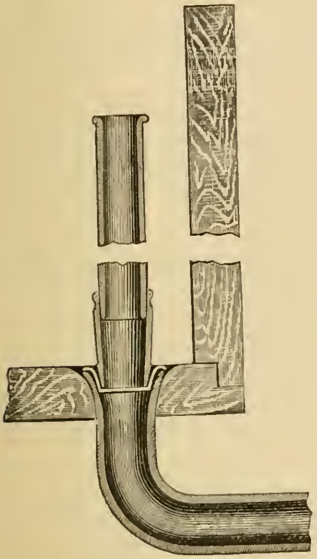
Fig. 48.

The many varieties of tubs used for personal cleanliness, such as foot-tubs, sitz-baths, shower-baths, bidets, etc., need no further explanation, as the principles for the sanitary construction of bath-tubs apply equally well to them.

LAUNDRY TUBS.

Laundry tubs are made of various materials such as wood, or wood lined with sheet-lead, enamelled or galvanized iron, cement stone, soap-stone or earthen-ware. Wooden tubs are objectionable as this material readily absorbs the dirty water and becomes foul, emitting a close odor when not in use. Being alternately wet and dry they are liable to leak and will quickly rot. Cement stone laundry tubs are cheap, durable and cleanly. They have no seams, each tub being manufactured in one piece, and therefore will not leak. Galvanized or enamelled iron and soap-stone trays are equally good and much in use. The white crockery or "ceramic" tubs are undoubtedly the neatest, and are always perfectly clean and sweet. They are not subject to wear or leakage, nor do they absorb dirty water, and therefore do not become foul from use. They are, of course, more expensive than any of the others. The outlet pipes from a set of laundry tubs should join, and have beyond the last pipe one common trap of proper size—either a suitable mechanical trap or an S trap, with proper vent pipe, in cases where siphonage is likely to occur.

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*This will also apply to the overflow from wash-bowls, sinks and tubs.

KITCHEN AND PANTRY SINKS, LAUNDRY AND HOUSEMAID'S SINKS.

These sinks are made either of wood, lined with lead or with copper, or of cast-iron, which may be galvanized or enamelled; of copper, soap-stone, slate or earthen-ware.

For pantry sinks tinned and planished copper is generally used, being preferable to porcelain or soap-stone sinks, as glass and crockery is not as liable to breakage in them.

For kitchen and laundry sinks soap-stone or iron is recommended. Galvanizing or enamelling the iron much improves the appearance of the sinks. Housemaid's sinks, used only to draw water, may be of small size and look most cleanly when manufactured in earthenware, although other materials are equally good.

Sinks are, as a rule, encased in tight wood-work, and consequently a close, damp and foul smell is often noticeable in the compartments under the sink. This method of fitting up sinks is decidedly objectionable. The space underneath should be free to light and ventilation, and readily accessible for frequent cleansing. To use an unventilated, closed space under a kitchen sink for the storage of kitchen utensils is a practice which should be strongly condemned.

Sinks should either be supported by brackets properly fastened to the walls, or else they should rest on legs. The floor under the sink and the wall back of the sink may be laid in white Minton tiles, which makes a neat and most cleanly arrangement.

Sinks should be provided with strong, metallic strainers, either open or plug strainers. In both cases the strainer should be securely fastened to the sink so as *not to be removable* by servants, in order to prevent obstructions of the waste pipe. It is important that sinks with plugs* should have an overflow-pipe of sufficient capacity to carry off the full supply, in case the supply cock should be accidentally left open.

GREASE TRAPS.

Through kitchen and pantry sinks a large amount of grease, derived from washing dishes, etc., is emptied into the drainage system. This grease proves to be of all the waste matters in the house the most difficult to deal with. Being dissolved by hot water it passes the strainer of the sink in a fluid condition, but soon becoming chilled it adheres to the sides of the waste pipes or drain, and lodges in the traps, unless properly taken care of.

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*This applies also to wash-bowls, bath-tubs, etc.

If the drain inside and outside of the house has a very good pitch, the grease will probably be carried far away from the house before becoming solid. This is more likely to happen where sinks have plugged outlets, as the rush of the water carries the grease very far. The ammonia of urine will remove grease, and thus pipes receiving above the point where the waste from the kitchen or pantry sink enters the cellar drain a water-closet or urinal discharge are often found to be comparatively free from grease.

But in large houses, or hotels, etc., the grease should not be allowed to enter the house drain at all; it should be intercepted by a proper grease trap, placed as near to the sink as the locality may permit. The grease trap may be placed either *within* the house, in the basement or directly underneath the sink, or else *outside* the house. The latter arrangement is much the best, provided the distance from the kitchen sink to the grease interceptor is not too great, otherwise the grease would congeal on its way to the interceptor. A circular tank made of bricks, laid in hydraulic cement, should be constructed of dimensions depending somewhat upon the size of the house (Fig. 49 and 49 a.) It should be large enough to allow the water time to cool. Its overflow pipe consists of a quarter bend, or better, of a T branch, (Fig. 49 a,) dipping at least six

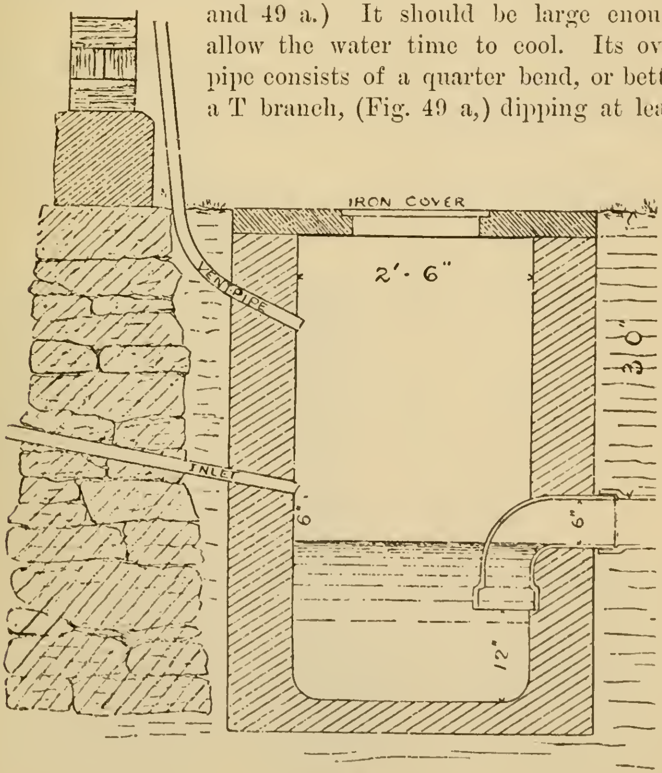


Fig. 49.

inches below the water line, in order not to disturb the grease in the intercepting tank. This grease trap should be frequently cleaned, and inspected. The grease, floating on top of the water, can easily be removed. Efficient ventilation by a large vent pipe should be provided. Wastes from kitchen and pantry sinks only should discharge into the grease trap.

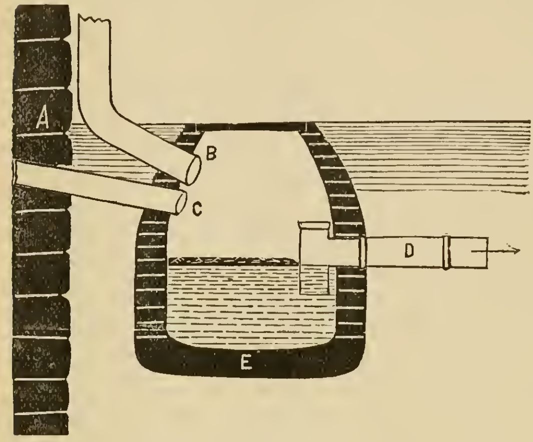


FIG. 49 a.

If inside of the house and in the basement, the grease trap may be made of earthenware, of wood lined with heavy lead, or of copper. But such a grease trap in the basement cannot be recommended.

If directly under the sink it may be made of enamelled or galvanized iron, of copper or of crockery ware. What is known as Carson's sink has an iron receptacle for grease immediately below and attached to the sink. It is doubtful whether these tanks under sinks can be made of sufficient size, without becoming clumsy, to allow the grease to cool and congeal. Unless properly attended to—and the kitchen sink is liable not to be kept perfectly clean by the servants—grease traps inside of a house constitute, in my opinion, cesspools on a small scale, holding fatty waste matters which readily become putrid and offensive. If there is no convenient place for an outside grease trap, better use none at all and trust to the action of the alkalies to "cut" the grease in the pipes. A valuable cleansing agent for pipes, where the use of a grease trap is omitted, may be found in occasional flushing with hot solutions of common washing soda, or better, of potash.

SLOP SINKS AND SLOP HOPPERS.

We have hitherto considered only those fixtures which receive foul water unmixed with the discharges from the human system. Slop sinks and slop hoppers, as well as water-closets and urinals, intended to convey to the drain these foul discharges, are more liable to become foul outside and inside, unless carefully attended to.

Slop hoppers should be arranged on bed-room floors to enable servants to empty chamber-slops into them. They should be flushed at each discharge by a sufficient quantity of clean water, and this flush is fully as necessary here as in the case of water-closets. Slop sinks should be made either of enamelled cast-iron or of earthen-ware. They should be provided with a fixed strainer at the outlet. The waste need not be larger than 2 inches in diameter and should be trapped by a suitable trap. If an S trap is used, it must be properly guarded against siphonage, which is very likely to occur when a pail of water is suddenly emptied into the sink. Instead of a sink, a combination of a sink and a conical-shaped, iron hopper, such as Merry's slop hoppersink, manufactured by the J. L. Mott Iron Works, is sometimes used, and, if provided with a strainer, it will answer very well. An earthen-ware bowl, with improved flushing rim on top of an iron or lead hopper, will make a cleanly device. If a water-closet is fitted up without any wood-work (except the seat), such as described on page 332, it may also serve the purpose of a slop sink. This would not be advisable in the case of a water-closet encased in wood-work, as the latter would readily become impregnated with the foul water, carelessly emptied and often spilled.

URINALS.

No fixture is so liable to become unclean and foul smelling as a urinal, owing to the rapid decomposition of the urine. A urinal requires a very large amount of flushing water; even then, a small amount of urine, spattered over, is apt to become very offensive. Swinging urinals and lipped urinals have been much used in modern houses, but I should certainly advise to do away with them entirely in private residences, as a properly constructed water-closet may safely take their place.

In public places, such as hotels, schools, railroad depots, places of amusement, etc., they, however, become a necessity. For these places three kinds of urinals are in use, viz.: the so-called "Bedfordshire" and lipped urinals, of enamelled iron, or better of earthenware,

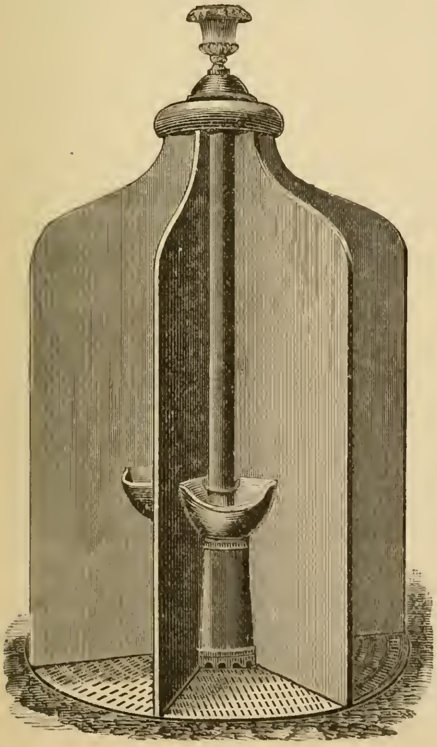


FIG. 50.

for the enamel soon scales off; of these a number may be placed and fastened along a wall, with partitions of wood, or preferably, slate between them. The second kind much in use are urinal troughs, made of wood lined with lead, or of galvanized or enamelled cast iron, or else of slate. Finally, for out-of-door location, round urinals are used, furnished with a large circular bowl, holding a body of water, and with a number of projecting lips, separated by suitable partitions. Fig. 50 and 50 a, illustrate such a urinal, manufactured by the J. L. Mott Iron Works, New York.

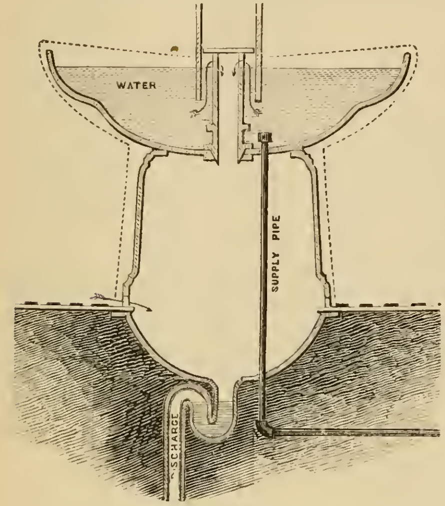


Fig. 50 a.

The material for urinals should be non-absorbent and should not easily corrode. A constant stream of water should trickle into a trough or bowl urinal, in order frequently to change the water in the latter, but also to secure an immediate and thorough dilution of the urine. Earthenware single urinals should be flushed either by a stop-cock, or better by some automatic arrangement, such as a suitable flush tank or tilting tank, (see page 337,) discharging at frequent intervals and completely flushing the urinal. Waste pipes from urinals need not be larger than 1½ in. or 2 in. diameter. The outlet of the urinal should be protected by a strainer, to prevent obstructions of the waste pipe. The ventilation of urinal apartments should receive special attention.

WATER-CLOSETS.

Water-closets should be in all houses that make any pretensions towards convenience. That they are a vast improvement over the old fashioned, offensive privy-vault in the back yard, everybody will acknowledge. But it is equally true that, unless of a good pattern, properly fitted up, cleanly used, carefully watched and frequently cleansed, they may become not only the sources of foul smell but also the cause of disease.

Leaving aside the question of the pollution of the soil and of well-waters, of which the privy-vault must sooner or later be the cause, it is in itself a nuisance and an abomination. In cold weather and during rain-storms persons are liable not to use it, when they ought to, and trouble of the digestive organs is sure to follow, as every physician knows. This is especially the case with females and with delicate children. Sick persons and invalids may suffer severely from exposure to the weather. Add to this the often unbearable stench emanating in hot weather from such vaults, and it will be readily seen how superior in point of convenience, health and cleanliness an indoor water-closet is.

There are other improved devices for receiving fæcal matters, such as earth-closets, ash-closets, tubs or pails, which are far preferable to privies, and should be recommended wherever water is scarce; but these do not properly belong to the subject of this paper, which refers only to the "water carriage" system.

After reviewing the different patterns of water-closets in use we shall speak about the general arrangement of the water-closet apartment with respect to light and air.

There is an endless list of water-closets, and each year increases the number of newly invented and patented articles. It is, of course, impossible, nor even desirable, that my paper should give a complete description of all of them. I shall limit myself to describing the chief features of the various types of closets, illustrating each of them by a few examples.

The most important points to be considered with a water-closet are: the shape of the bowl or vessel receiving fæcal matters; the manner of discharging the contents of the bowl; the manner of flushing the bowl; the manner of trapping the water-closet; and the ventilation of the water-closet.

A water-closet should be separated from the drain or soil pipe by at least one efficient trap, *the contents of which should be thoroughly changed with each use of the closet.* It should have a *copious supply of water* completely to wash at each use the bowl and other surfaces, coming in contact with foul matters. Much will depend upon the manner of the flush. It is decidedly preferable to flush a water-closet from a special cistern, and not directly from the main supply pipe. Allowing the water to run continuously through a water-closet cannot be regarded as *flushing.* Two or three gallons properly applied at each use will cleanse a water-closet more thoroughly than an uninterrupted trickling flow of water. In order to be efficient *the flushing water should come down "in a sudden dash."* A flush introduced into the bowl in the direction of the tangent will whirl around its circumference, losing its force without effecting much cleansing. A fan flush, or a proper *flushing rim* all around the bowl are vast improvements. With a proper trap and a good flush, every water-closet judiciously used and well taken care of should be *inodorous.*

A further requirement is *simplicity of the working apparatus.* The less moving parts a water-closet has the better will it be. We must bear in mind the rough usage to which such fixtures are sometimes subjected in public places. Delicate or complicated mechanisms will fail to work properly under children's or servants' hands.

The less *surface* a water-closet has *exposed to fouling*, the cleaner and better it will be. All foul matters should pass into water as quickly as possible. Thus the fouling of the sides of the bowl will be efficiently prevented, and the water will tend to deodorize the excrements. This is accomplished in all water-closets holding a large body of water in the bowl. In others, where the body of water is in the trap, this should be as near as possible to the bowl, and the rear side of the latter should be designed as straight as possible.

With these general principles in view, let us examine the different patterns, which may be divided into five distinct classes, viz.:

1. Pan closets.
2. Valve closets.
3. Plunger closets.
4. Hopper closets.
5. Washout closets.

1. PAN CLOSETS.

To this class of closets belong the Philadelphia valve closet, the Bartholomew valve closets, and many others. The name "valve" closet is an improper one, and leads to confounding these closets with those of class 2. The name is derived from the manner of supplying the flushing water to the closet, by joining the supply pipe to a more or less slow shutting valve, worked by the pull or handle of the closet. These valves are mostly unreliable, wear out and leak, especially when subjected to varying pressure from the street main. The mode of flushing a water-closet from the main supply is decidedly objectionable, especially with closets located in upper stories of city houses. If water is drawn from a faucet in the basement, instead of water flowing out at the valve of the water-closet, air sometimes rushes in from the bowl. Thus the purity of the drinking water is endangered, while the water-closet often remains without a flush. Pan closets may, however, be flushed by a special cistern with lever arrangement, and therefore the above serious defect is not one characteristic to these kind of closets.

The real defects of the pan closets will be at once apparent by inspection of Fig. 51. The excrements are received in a bowl, closed at the bottom by a copper pan, holding a few inches of water and

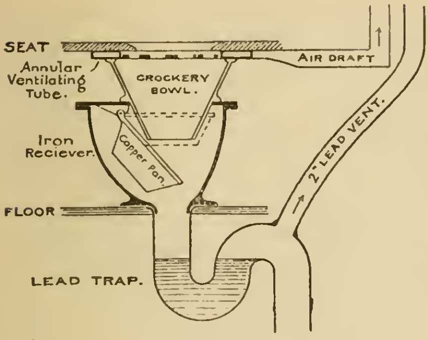


Fig. 51.

forming a seal against the air from the container. The contents of the bowl or pan are discharged by tilting the pan by means of a lever, while a flush is simultaneously started. This pan works in an iron receiver or "container," upon which the bowl is usually fastened with putty. The outlet of the receiver is trapped by the common S trap, although it is not uncommon to find in old houses a D trap under the water-closet, a second "container" of foul matters. The foulest part of the pan closet is the receiver, for the solids gradually accumulate on its sides, as these receive no washing from the flush. The filth soon undergoes decomposition, and the resulting gases, having been confined by the double water-seal of the pan and the trap, are expelled into the apartment at each use of the closet. They also frequently find an exit at the hole, through which the spindle, tilting the pan, passes. And finally the putty joint between bowl and receiver may become untight and afford means for the passage of sewer gas. The flush is insufficient in most pan closets to clean the bowl; it certainly loses all its force before reaching the container, foulness accumulates here and excremental matter lodges in the trap, as the flush is not strong enough to drive it out through the dip or water-seal.

Some of the enumerated defects may be remedied: by enamelling the inside of the cast-iron receiver; by ventilating it by an inlet pipe for fresh air and a vent-pipe; by having special flushing arrangements for the container; by using a bowl with an improved flushing rim or a fan spray, the water for the flush being derived from a special tank. But by all these costly improvements the *only* merit of the pan closet, its cheapness, is annihilated, and a better water-closet may as well be used. As long as a house is fitted with pan closets, of whatever pattern, it may be said not to have reached the standard of safety from a sanitary point of view.

2. VALVE CLOSETS.

To this class belong the following water-closets: Hellyer's improved valve closet (Fig. 52), Demarest's Acme closet (Fig. 53), Carr's Defiance water-closet (Fig. 54), the Lambeth valve closet, the Lambeth trapless closet (Fig. 55), Bean's valve closet (Fig. 56), the three latter English specimens, and many others.

The valve closets are certainly a vast improvement upon the pan closet. Instead of being closed by a pan, the bottom of the bowl is closed by a flap-valve, from which the closet takes its name. This valve is tightly held in place by a counter-weight on a lever to which the pull is attached. By lifting the pull the valve, which is hinged, is turned downward, and allows the contents of the bowl to drop into the trap. The container is much smaller than in the case of pan-closets. It generally has a ventilating pipe to remove foul gases. The bowl holds a large quantity of water into which the solids are dropped and instantly deodorized. It is provided, with some of the best closets of this type, with a superior flushing rim, and is flushed by a special cistern (Fig. 52 and 53.) As the flap closes tightly against the bottom of the bowl this must be provided with an overflow, which should have a

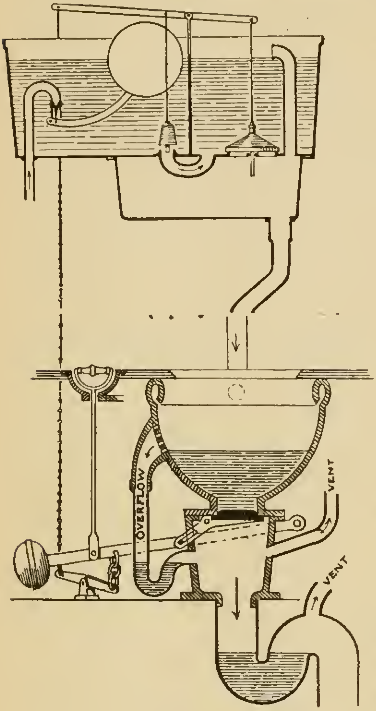


Fig. 52.

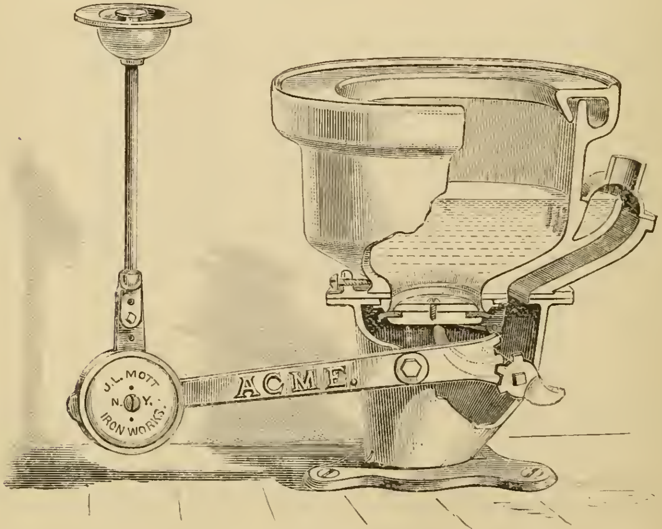
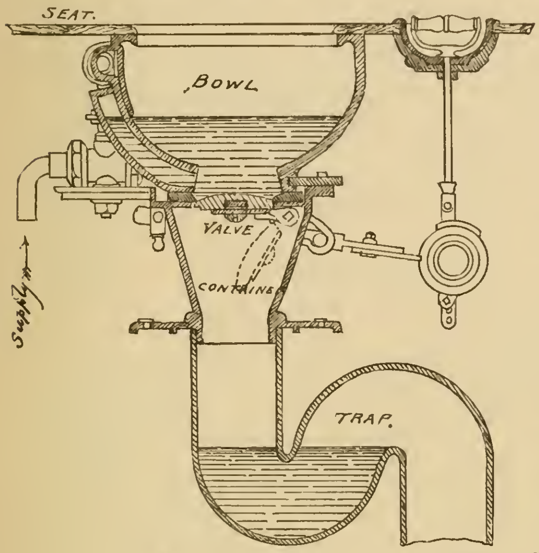


Fig. 53.

trapped connection to the container. Unless some water is furnished to this trap at each flush the trap is liable to lose its seal by evaporation, thus establishing a direct connection between the container and the atmosphere of the water-closet apartment. Such driblet to the trap of the overflow is supplied at each flush in the better valve closets. There is some danger of the fouling of the container. But to prevent this, the better closets have the inside of the container enamelled, and as a larger body of water rushes from the bowls through the container at each discharge, the danger is much less than with the pan-closet. If such closets are flushed from a valve the solids will be driven out of the lead trap only after repeated flushing. Better closets of this class (Hellyer, Acme,) have suitably arranged cisterns, which deliver quickly a large body of water through improved flushing rims, and thus the danger from foul matter being retained in the trap is much reduced. After continued use the flap-valve is liable to leak; excrements or paper may stick to it and prevent its tight closing. The water will leak out of the bowl and the advantage of a double trapping is consequently lost.



CARR'S PATENT AMERICAN DEFIANCE CL.

FIG. 54.

The Lambeth trapless closet and the Bean closet (Figs. 55 and 56) are different from the closets just described. The outlet of their bowl is closed by a flap, hinged to pivot and lever and held in place by a counter weight, but placed vertically against the outlet of the bowl. Such valves may be less liable to be fouled with solid matters and may close more tightly on this account. The water rushing out of the bowl in a large body will effectually flush the outlet of closet and trap.

Fig. 55.
Lambeth "Trapless" Closet.

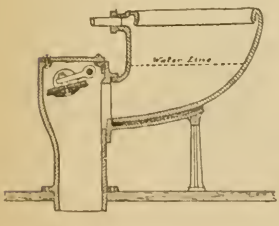
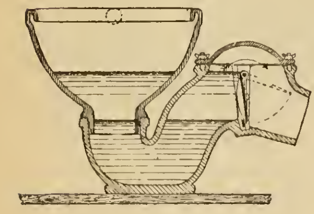


Fig. 56

Bean's Valve-Closet.



The Lambeth closet, in order to avoid any accumulation of solids in the trap, does away with it altogether, but I do not consider this a safe arrangement, and would much prefer dispensing with the additional water-seal in the bowl than with the trap underneath the closet. For should the mechanism of such a flap-valve get out of order the house would be entirely open to the invasion of sewer gas from the soil pipe.

3. PLUNGER CLOSETS.

Among closets of this type I mention the Jennings' closets (Figs. 57 and 58), the Demarest closet (Fig. 59), the "Hygeia" (Fig. 59a), the Zane closet (Fig. 60), Moore's closet, Pearson's Twin Basin closet, Myers' Gale closet, Myers' China closet, the California "Perfection" closet, and others.

The characteristic detail of all these is the plunger closing the outlet of the bowl, which is mostly placed at the side of the closet. The foul matters drop into a large body of water in the bowl, are therefore partly deodorized and easily removed from the bowl. By lifting the plunger the contents of the bowl are rapidly discharged into the soil pipe, and the rush of the water, leaving the bowl, is so great as effectually to drive all matters through the dip of the trap. The latter must be efficiently protected against siphonage, which is more likely to occur with plunger closets than with the pan, valve or hopper closets. The danger with closets of this class lies in the fouling of the plunger chamber. Waste matters and paper may stick to the seat of the plunger or to its sides; the outlet will then be imperfectly closed, allowing the water to leak out of the bowl. Closets having a small plunger chamber are the better ones, not only because they will be cleaner, but because with large chambers the waste of water must necessarily be large. In this regard the Hygeia closet (Fig. 59 a) is probably superior to all plunger closets heretofore made; it is flushed by a special cistern and therefore requires no supply valve nor float in the plunger chamber.

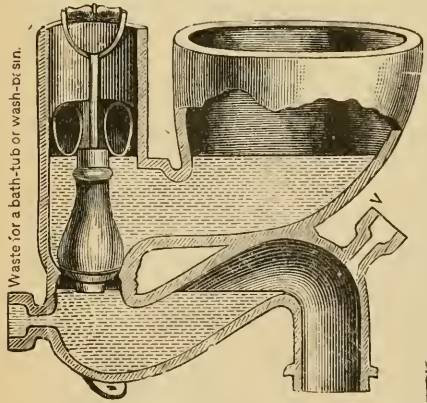


Fig. 57.

In some plunger closets (Gale closet, China closet) a special spray arrangement is intended to wash the sides of the plunger and its chamber at each use of the closet, but, while it may be efficient, it tends to complicate the closet. The better closets of this class provide the top of the bowl with an improved flushing rim (Hygieia closet, China closet), or wash the sides of the bowl by an effective fan or water-spreader (Demarest closet). In order to provide for an overflow the plunger is sometimes made hollow (Figs. 59 and 59 a), and when trapped it is so arranged that the water forming a seal is renewed at each flush (Fig. 59.) Otherwise it is liable to evaporate and this is especially dangerous with plunger closets that are trapless. In some closets an independent overflow is arranged (Fig. 58). Most of these closets are flushed by a valve,

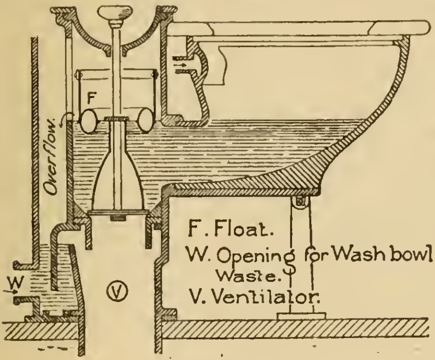


FIG. 58.

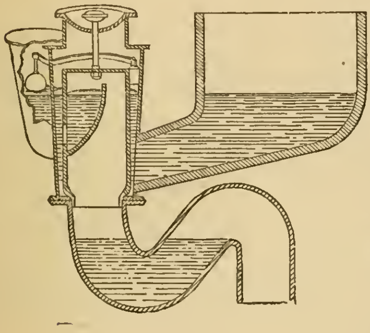


FIG. 59.

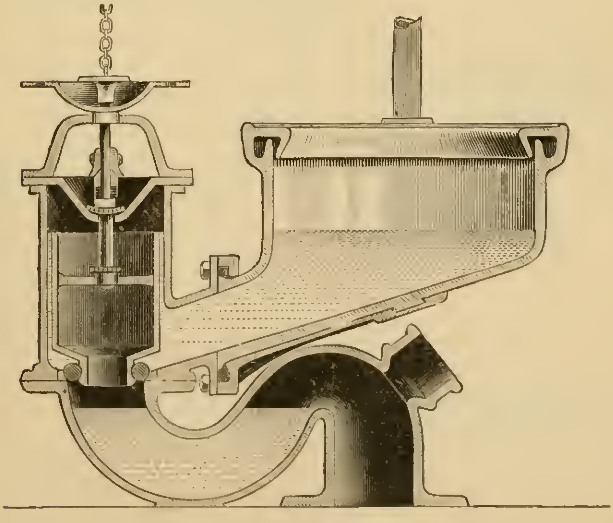


FIG. 59 a.

worked by a float in the plunger chamber. These valves are not always reliable, especially under varying pressures, and it is much better to flush these closets from a special cistern, as is sometimes done with the Demarest and Jennings' Closet, also with J. L. Mott's "Hygeia" closet (Fig. 59 a.)

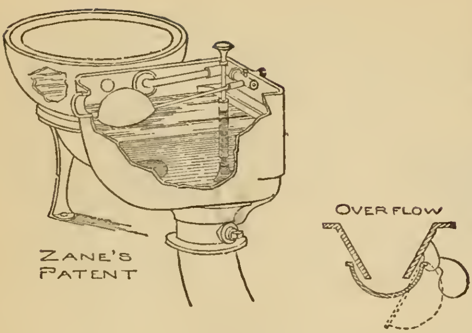


FIG. 60.

4. HOPPER CLOSETS.

There are many varieties of hoppers, made of either iron or of earthenware. The latter are much preferable; and the former should never be used unless well enamelled inside. Hoppers (Fig. 61) are sometimes liable to become soiled at the sides of the bowl, and for this reason have not become favorites with many. The hopper lacks the advantage of the pan, valve and plunger closets, in which the excrements drop immediately into a more or less large body of water, and thus carried in suspension by the water, are easily removed from the bowl by tilting the pan or valve, or by lifting the plunger. A good practice

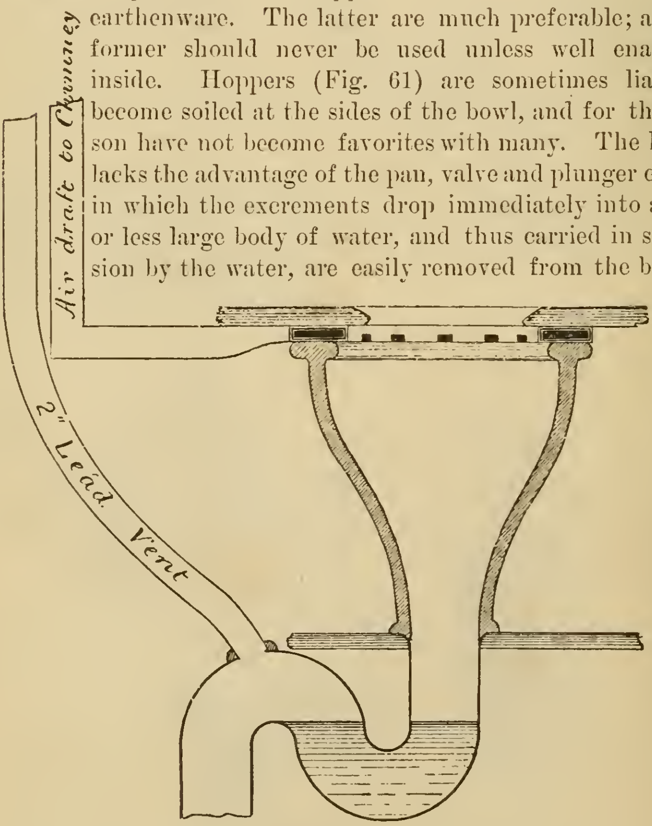


FIG. 61.

is to wet the sides of the hopper before use, and where the hopper is flushed by a special cistern such a device has been arranged to work automatically. The rear part of a hopper should be vertical and straight so that matters will drop immediately into the water of the trap without touching the sides of the hopper. The inside of hoppers should be very smooth, and for this reason earthenware is much preferred to enamelled iron, because the enamel scales off gradually. In order to have as little surface as possible exposed to fouling, the sides of the hopper should be short, which is in some accomplished by having the trap above the floor (see Figs. 62 and 66). The apparent greater cleanliness of the pan, valve or plunger closets is simply a delusion. It is true, the hopper will sometimes have its sides soiled with excrementitious matter, when the supply or the manner of flush is inadequate. But the defect is in sight; it shows itself to the person using or in care of the closet, and it can easily be remedied by proper occasional application of hot water, soap and a scrubbing-brush. Not so with the other closets. The dirty matter may be out of sight, but it often remains, hidden from view, in those parts of the closet which are not easily accessible and therefore never cleaned or inspected until a leakage occurs, or until some foul odor compels the householder to call for the plumber.

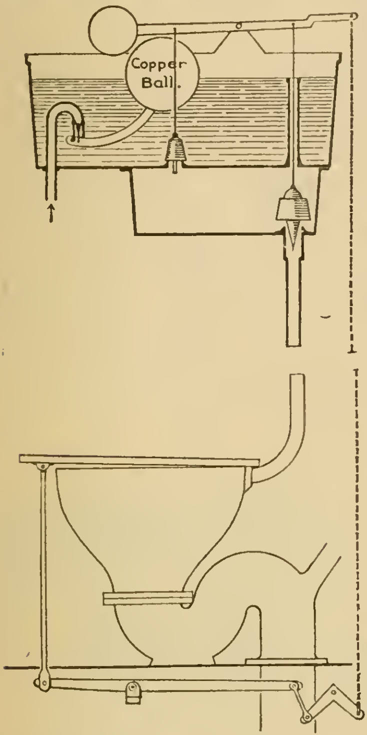


Fig. 62.

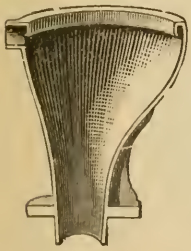


Fig. 63.

The great merit of hoppers lies in their simplicity and in the total absence of any mechanical parts, which

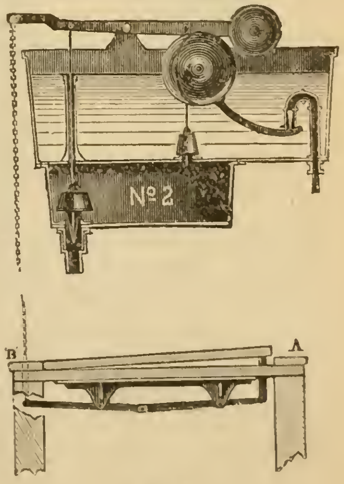


Fig. 64.

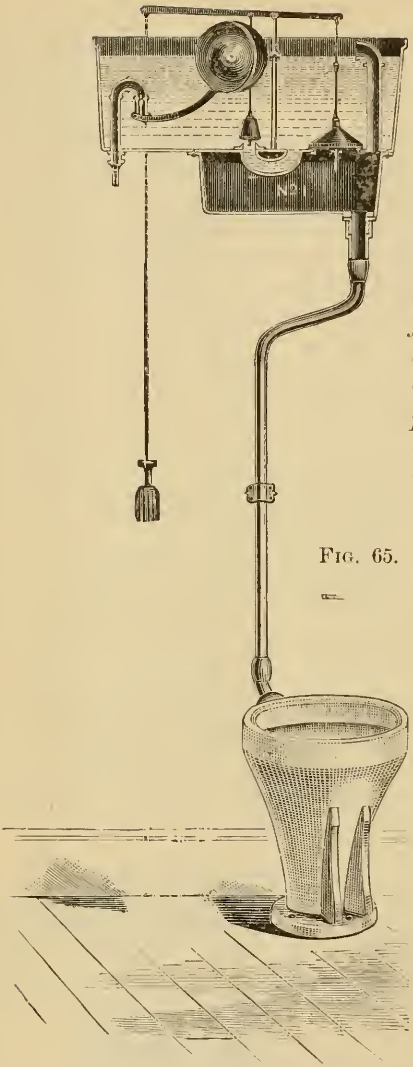


Fig. 65.

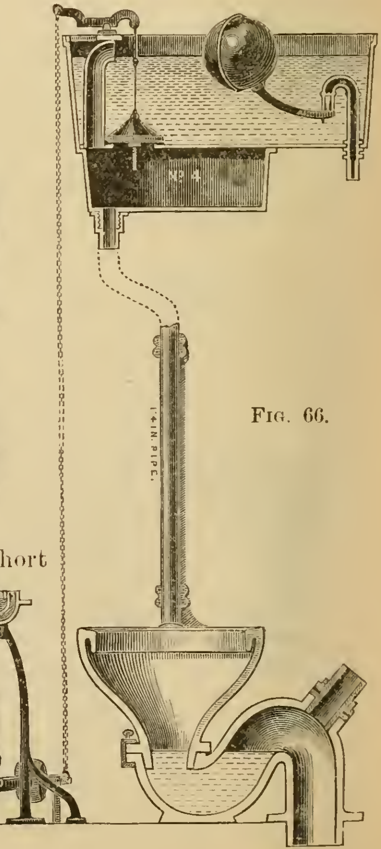


Fig. 66.

sooner or later, fail to work properly, especially when the closet is carelessly used. Much depends with a hopper-closet upon the flush. The practice of turning a stopcock and thus introducing a feeble stream into the hopper, which whirls around its inside, is objectionable. Hopper-closets should always be provided with *flushing cisterns* allowing a *bountiful supply* to rush vertically downward through a *large supply pipe* and a *well-shaped flushing rim*. Among the best hoppers, I mention Hellyer's long Artisan Hopper (Figs. 63 and 65), Hellyer's short Artisan Hopper (Figs. 62 and 66) having trap above the floor, A. G. Myers' Niagara Hopper (Fig. 68), Demarest's long and short earthen hoppers, Rhoads' hopper (Fig. 67), and others. Rhoads' porcelain seated hopper is a cleanly device for hospitals, schools, factories, railroad depots, public buildings, etc., provided it is well flushed, and only where the apartment can be well heated in winter, as otherwise, the seat being cold, the closet is liable to be improperly used. The Niagara Hopper, provided with a wooden rim for a seat, attached directly to the bowl (Fig. 69), will answer better than Rhoad's hopper in exposed places, the only objection being the possible absorption of urine through the wood.

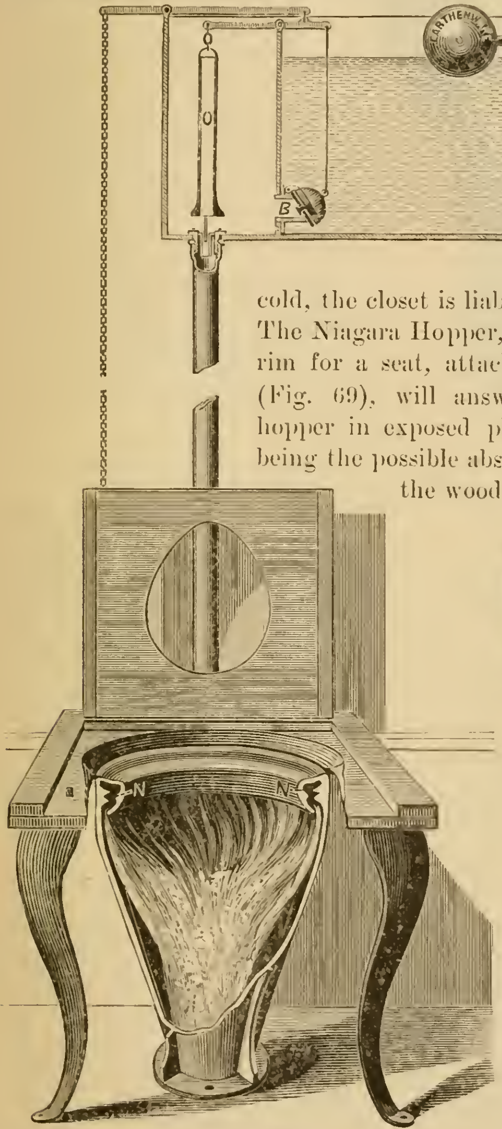


Fig. 68.

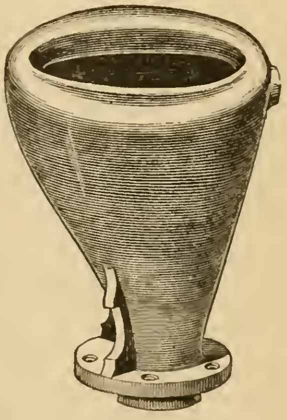


Fig. 67.

Improved flushing cisterns for water closets are manufactured in great varieties; Figs. 64-66 illustrate some of these. Fig. 64 shows a waste

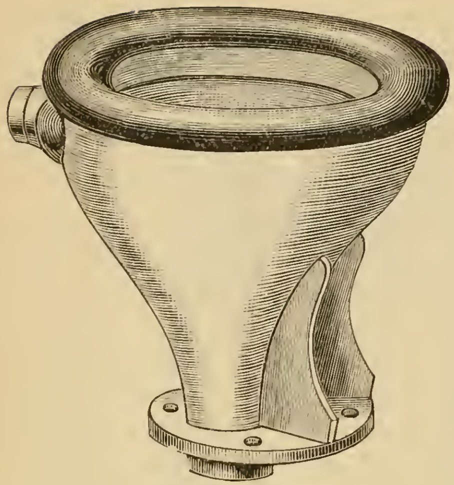


Fig. 69.

preventing cistern, which is worked by a depression of the seat when the closet is used; the flush is therefore automatic. Fig. 65 illustrates a waste preventing cistern which is operated by a pull and tassel. In Fig. 66 the valve of the cistern is opened by lifting a handle at one end of a fixed lever, the other end of which is connected by a chain to a second lever in connection with the valve.

5. WASHOUT CLOSETS.

I have grouped a number of recently invented water-closets into this last class which I consider, *in principle*, far superior to any of the other closets for the following reasons: They are mostly made in one single piece of earthenware and are entirely free from any movable parts. Moreover, the bowl is shaped in such a manner that its outlet or overflow forms a very efficient water seal trap, thus obviating the necessity of a trap under the closet. All washout closets have their basin so shaped as to hold a large quantity of water; the advantages of such an arrangement have been already stated. A washout closet is in fact only a modified form of hopper, the improvement being the shape of the basin permitting the excrements to drop into water, and forming a water seal. Different means are employed with the closets of this class to effect a discharge of the bowl. In many the downward rush of water directed through proper flushing rims so as to concentrate its main force at the outlet of the basin, drives the contents of the bowl into the overflow, and thus into the soil pipe. In others a jet of water is introduced into the outlet pipe and carries all water from the bowl, partly by the force of the jet, and partly by starting a siphoning action. In still others a partial vacuum is created by different means in the outlet and a true siphonage established.

Among the washout closets I mention: the California Syphon Jet closet (Figs. 70*a* and 70*b*), the National Side Outlet closet* (Fig. 71), Owen's closet (Fig. 72), Bostel's Brighton Excelsior closet (Fig. 73), the Lambeth "Flushout" closet (Fig. 74), Carmichael's "Washdown" closet (Fig. 75), Hellyer's Vortex closet (Fig. 76), and others.*

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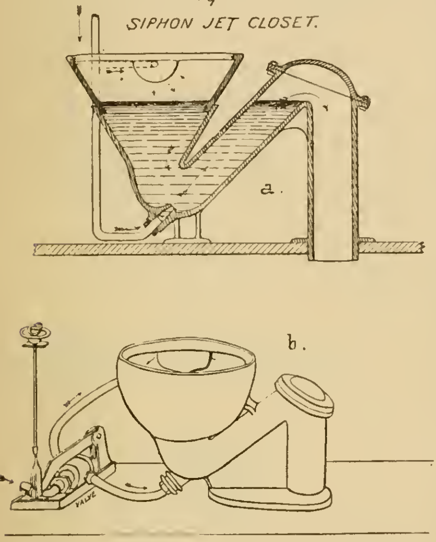
*Lately introduced into this country by Messrs. Henry C. Meyer & Co., New York.

The "Siphon Jet Water Closet," invented by Wm. Smith, of San Francisco, is shown in Fig. 70, *a* and *b*. It is manufactured either of iron with earthen bowl (*a*), or entirely of earthenware (*b*). A section through the closet, showing the application of the jet, is shown in Fig. 70*a*; a view of the earthenware closet is shown in Fig. 70*b*.

FIG 70
SIPHON JET CLOSET.



The emptying of the closet is effected by means of a jet introduced at the lowest point of the bowl and delivering into the inclined leg of the closet. This jet carries all water out of the basin, while a small stream from the fan spreader in the bowl is intended to rinse and wet the sides of the closet. After emptying the closet a slow after-flush trickles into the bowl, refilling it to the proper height of the overflow, thus making it ready for another operation.

The water for jet and flush is supplied either from a special cistern, to be worked by a pull, or automatically by a depression of the seat, or else through a valve (Fig. 70 *b*), operated by lever and pull. A large supply pipe (1½-inch) from tank to bowl is necessary to make the jet effective. A large head of water—say 9 to 12 feet—is desirable to work the closet satisfactorily. Each flush requires about 3 gallons of water and preferably more. In places where the whole water supply of the house has to be raised by pumping, the large amount of flushing water required may be an obstacle to the use of the closet. In other cases it may prove a difficult matter to locate the water-closet cistern sufficiently high above the bowl. But in places where water is ample (supplied under pressure) and ceilings high, the closet works to great satisfaction. It is strong, durable, most cleanly, without any movable parts, and holds a large body of water in its basin; it has a large water-dip for a trap but no foul matters can possibly lodge in the latter as the force of the jet is introduced at the very point where accumulations of solids are most likely to occur in common traps.

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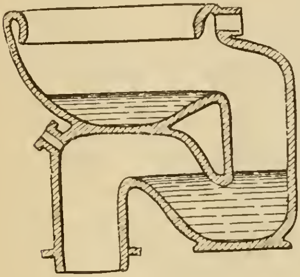
* Two lately introduced American washout closets are the "Dececo" closet, invented by Col. Waring, sold by A. G. Myers' Sanitary Depot, N. Y., and the "Tidal Wave" closet, sold by Messrs. Henry Huber & Co., N. Y.

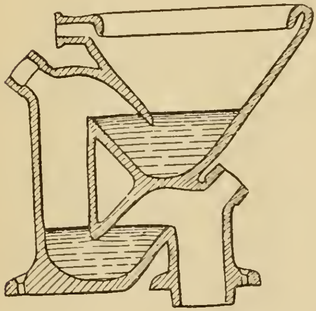
Hellyer's Vortex closet is shown in Fig. 76. It is made of finely glazed white ware. "A trap is formed in this closet in conjunction with the basin in such a manner that the mouth or dip of the trap forms the bottom of the basin. By this arrangement a body of water is always made to stand in the bottom of the basin or in the inlet of the trap to receive the deposit. The water standing in the basin . . . . . is about 5 inches deep. The configuration of the basin is such that the excrement shall not touch the sides before passing into the standing water in the closet. By this arrangement of basin and trap the full vertical force of the incoming water

FIG. 71



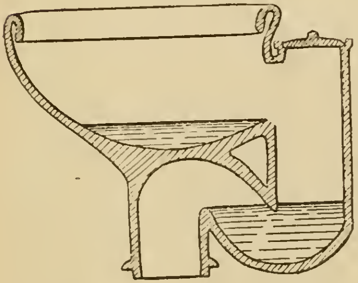
NATIONAL SIDE OUTLET CLOSET.

FIG. 72.



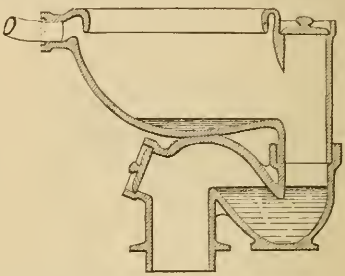
OWEN'S CLOSET.

FIG. 73.



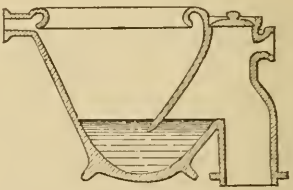
BOSTEL'S EXCELSIOR CLOSET

FIG. 74.



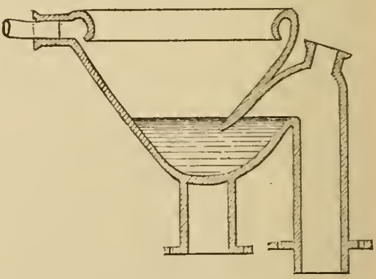
LAMBETH FLUSHOUT CLOSET.

FIG 75



CARMICHAEL'S WASH-DOWN CLOSET.

FIG 76.



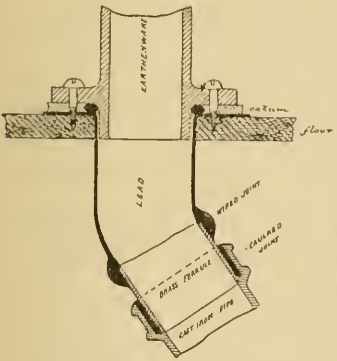
HELLYER'S VORTEX CLOSET.

supply is brought to bear upon the standing water of the trap, instead of spending its strength upon the basin. . . . . Hence, with any fair flush of water, no excrement is left behind, either in the basin or trap, but both are well washed out after every usage of the closet." This Vortex closet may be supplied either from a cistern or from a valve. It is sold by Henry C. Meyer & Co., N. Y.

The Carmichael "Washdown" Closet (Fig. 75) is very similar to the Vortex Closet; both these closets as well as all others, except the "Siphon Jet Closet," are English closets, and seem, of late, to be preferred in England to other styles of water-closets. The three closets, shown in Figs 71, 73 and 74, have the basin and outlet shaped so as to hold water and also have an earthenware trap above the floor; Fig. 72 is a closet with a double trap. Most of these closets have ventilating attachments and inspection holes.

As these closets dispense with the lead S trap underneath, it becomes of the greatest importance to have a tight connection between the closet outlet and the soil pipe. Fig. 77 illustrates the manner of making such a joint. A lead thimble is connected by a wiped joint to a brass ferrule, which is caulked into the hub of the soil pipe. The lead thimble is enlarged at the top and the earthenware flange of the closet inserted into it, resting with its horizontal flange upon a ring, made either of soft india rubber or of oakum, saturated with red lead. The wood screws drawn through the earthen flange effectively tighten the connection.*

FIG 77.



It is believed that the above classification covers the principal known devices for the reception and removal of fæcal matters by the water-carriage system. The merits and defects of the different types of water-closets have, I believe, been sufficiently explained to guide in the selection of a proper closet.

I have omitted latrines or trough water-closets, which are sometimes used in public schools, factories, tenements, etc. A good substitute for these may be found in a number of earthenware hoppers, such as Rhoads', Hellyer's or the Niagara hopper, flushed by an automatic arrangement (McFarland's or Field's tank), entirely independent of the carelessness or forgetfulness of the user of the closet.

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* This same connection should be used for joints between earthen hoppers and lead traps.

GENERAL ARRANGEMENT OF WATER-CLOSET APARTMENTS.

The almost universal custom of encasing the water-closet in tight woodwork I decidedly condemn. Ventilation is impossible under the seat, and as the floor often becomes wetted with urine or water spilled through careless use of the closet, readily absorbing the filthy liquid, it will constantly remain damp and emit unpleasant odors into the apartment.

As an abundant supply of water is most essential to the interior of the bowl and closet, so is plenty of light and air indispensable to the outside of the closet. A water-closet should stand free on the floor, readily accessible on all sides. The only woodwork necessary is the seat; this should be hinged and leaned against the rear or side wall, when the closet is not in use. Such an arrangement looks especially neat where the floor is laid in tiles, and if the water-closet is entirely of white crockery ware, for instance a Niagara or Hellyer hopper, an earthenware Siphon Jet or other wash-out closet.

Col. Geo. E. Waring, Jr., thus describes such an arrangement:* a closet, "made of white earthenware, and standing as a white vase in a floor of white tiles, the back and sidewalls being similarly tiled, there being no mechanism of any kind under the seat, is not only most cleanly and attractive in appearance, but entirely open to inspection and ventilation. The seat for this closet is simply a well-finished hardwood board, resting on cleats a little higher than the top of the vase, and hinged so that it may be conveniently turned up, exposing the closet for thorough cleansing, or for use as a urinal or slop hopper. Such closets ought entirely to do away with the use of urinals in private houses, and if, for convenience or to prevent the possibility of baths being improperly used, separate slop sinks are desired, these should be constructed like the hopper closet, the outlet being protected with a movable basket of wire cloth made for the purpose."

The arrangement suggested adds, of course, to the expense of a water-closet, but, where white Minton tiles should prove too costly, a plain cement floor, or slate, or else enamelled tin may be substituted for them.

Wherever woodwork is used for the sake of better appearance of closets having mechanical parts (plunger closets, valve closets), at least the riser should be arranged with lattice work or a great number of perforated holes to provide ventilation under the seat.

It is desirable to locate water-closets near an outer wall, but this is not always possible in American city dwellings. The apartment should have ample light and, wherever possible, a window opening on the exterior of the house for ventilation. Where such a window cannot be arranged special ventilation of the apartment must be provided. Tin or galvanized iron pipes, extended — independently for each apartment — through the roof give good results, especially if a constant draft is created in them by a gas jet. Fresh air should be supplied to the apartment, either by blinds in the door, or else by cutting away the lower two or three inches of the door.

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*See Scribner's Magazine for June, 1881, "The Sanitary Condition of New York City"

Sometimes a special vent pipe is attached to the closet bowl, leading into a constantly heated flue, used for this purpose *only*; or else an upward draft is created in the vent pipe by connecting it with a chamber, in which a gas jet is burning, and the outlet pipe of which enters the flue, or extends up to the roof. Such a venting of the closet bowl is provided, for instance, in the Zane plunger closet, in R. D. O. Smith's "Odorless Hopper Closet," in the "Worcester Hopper" and others. Fig. 51 shows the pan closet, and Fig. 61 the common hopper arranged with such ventilation directly under the seat, by using an annular flat zinc tube, provided with a number of openings at the inner edge.

It would be a serious mistake to run such vent pipes into a kitchen flue, and far more so to run them into any other chimney of a building. There is at times a downward draft in these — even in the kitchen flue, the fire of which may go out over night —, and thus offensive gases from the closet would be carried into the house. Another reason against such a course is that small vent pipes would soon become obstructed by soot. The best course, where a special flue has not been arranged, is to run the vent pipes along some heated flue up to the roof, and terminate their ends at a point where they are well exposed to the currents of air.

It would almost seem superfluous to state that vent pipes from closet bowls should never enter a soil or waste pipe, or a vent pipe from traps. But such cases are not rare, and an instance of such pernicious practice — which should be considered either as criminal carelessness or else as utter stupidity and inability of the mechanic — was related to me only a short while ago.

No amount of ventilation, however, will keep the air of the apartment pure unless the water-closet is frequently and thoroughly washed and scrubbed. Such cleansing is much facilitated with the above suggested arrangement of a water-closet.

The following valuable remarks of Mr. Edward S. Philbrick upon this subject so fully express my own views, that I quote them *in extenso*:* "The location of plumbing fixtures in dark corners, under stairways and in closed closets is always to be avoided. Such fixtures, even if of the best materials and design, need frequent washing and even scalding to keep them sweet, and the more light and air can be admitted to them, the more likely will the occupant be to enforce such

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***See articles on "Domestic Sanitation," in the Sanitary Engineer, vol. II.**

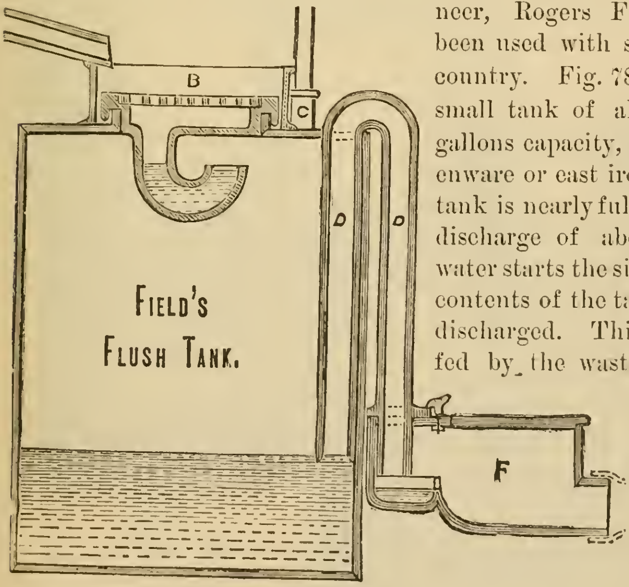
cleanliness. The best authorities in England recommend the location of water-closets outside the house walls, in towers or outside appendages. The rigor of our climate forbids such an arrangement in the Northern States, but they can often be so placed near the outer wall of the house as to allow of a window for the direct admission of light and air, i. e. in the same apartment. This can be done in all suburban houses without an undue sacrifice of light in the living and sleeping rooms, though city houses can rarely afford anything better than skylight and well light for them. . . . . . . The water-closets on the basement floor are generally the source of much trouble by injudicious location and subsequent neglect. The rareness of the inspection generally given to such fixtures by heads of families renders it all the more needful to place them where they can be readily and easily cleaned and well aired. . . . . . . But however good the apparatus and however well located, nothing will compensate for *neglect* by the occupants of the house. Frequent applications of hot water and soap are just as needful to the surfaces of such fixtures as to the bodies of the persons who use them. Of course the woodwork about them should be so put together as to be readily taken apart without tools by any house-maid, to be periodically cleaned and aired. What is the custom in this respect? Expensive apparatus is often seen so boxed up by screwed and even *nailed* joinery, that the spaces so enclosed are practically inaccessible and soon become abominably foul from spatterings. The less amount of woodwork the better, but by all means have the whole so as to be ready of access without the need of so much as a screwdriver, and let every house-maid be taught the necessity of a regular routine in the cleansing operations, scalding and scouring every surface which has been exposed either to the spattering of urine, or even to the perspiration of the body. It may not be always possible to enforce such discipline, but the less it is enforced, the more important become the items of light, air and simplicity of construction, as aids in the same direction. The latter are generally under the control of the architect, and his mistakes of planning entail a *permanent* and incurable evil, which it is therefore all the more important to avoid." . . . . . . "While every aid should be given to cleanliness by simplifying the apparatus, no amount of perfection in this respect will avoid the need of constant thought and care on the part of those who use the fixtures, as well as those whose duty it may be to cleanse them. Such perfections of apparatus are but aids, and though not to be ignored by any means, are after all but of little avail if the people who use them are reckless and wanton in their habits. It is difficult enough to keep such apparatus in good order in private houses where not used by any one beyond the supervision of the head of the family, but the trouble increases in a manifold ratio where fixtures are applied in hotels or public places, or in tenements to be used by more than one family."

FLUSHING APPLIANCES.

Flushing tanks should be provided in a system of house drainage, whenever it is impracticable to lay the drain at an inclination which will secure a sufficient cleansing flow. The idea underlying most of these flushing arrangements is the accumulation of a small flow of water—often merely a driblet—which continuously running, at a sluggish rate, would not be able to remove deposits in the drain. Whenever this water has accumulated to a large volume, the flush tank is automatically emptied and its contents are driven with a sudden rush through the drain. As this may be repeated as often as found necessary the inside walls of the drain may be kept thoroughly cleansed and any decomposition of organic matter is thus effectually prevented.

There are many varieties of flush tanks, such as Field's Siphon tank, McFarland's Tilting tank, Shone's flush tank, Maguire's tank, Rhoads', Hydes', Ivers', Wilson's, Guinière's tanks and others.

Field's flush tank is the invention of the well-known English engineer, Rogers Field, and has been used with success in this country. Fig. 78 illustrates his small tank of about 30 or 40 gallons capacity, made in earthenware or cast iron. When the tank is nearly full an additional discharge of about a pail of water starts the siphon, thus the contents of the tank are rapidly discharged. This tank may be fed by the wastes from wash-bowls, bath-tubs, etc. It should not receive wastes from water-closets. Fig. 79 illustrates the *annular siphon* of Rogers Field, which may be placed either in a tank of brick masonry (Fig. 80), or into an iron cistern (Fig. 81), or tank of wood, lined with lead. A in both illustrations is the annular siphon fitted into the tank B. The longer, inner limb of



Fig, 78.

siphon reaches into the trapping box or lower water chamber C, in which the water level is kept at about $\frac{1}{16}$ inch below the end of inner limb of siphon by means of a secondary siphon or weir arrangement (not shown in cuts). When the water from faucet E has filled the tank so that the water rises to the top of the longer (inner) limb of the siphon (as shown by a dotted line) it overflows, but is guided by a conical shaped adjutage to drop clear of the sides, and seals the mouth of lower limb. In falling the water carries air with it, which is thus displaced and driven out at mouth of inner limb in trapping box. A slight vacuum is gradually created in the discharging limb, sufficient to start the siphon, which rapidly empties the tank. As soon as air is admitted through outer limb of siphon, its action is stopped, all the water in the inner limb drops into the water chamber, and the auxiliary siphon — or else the weir arrangement — lowers the water line in trapping box about $\frac{1}{16}$ inch below mouth of inner limb. Air enters at this place and completely breaks the siphon, the tank is then ready for another discharge. The stopcock can be regulated to fill the tank more or less rapidly, according to option. Small tanks are well adapted for flushing a row of hopper-closets or urinals automatically. Larger tanks are used for flushing house drains,* but are equally well adapted for sewage disposal works, which, however, do not come within the scope of this essay.

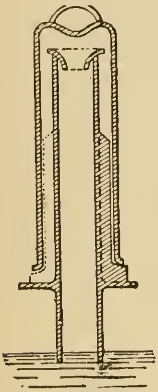


Fig. 79.

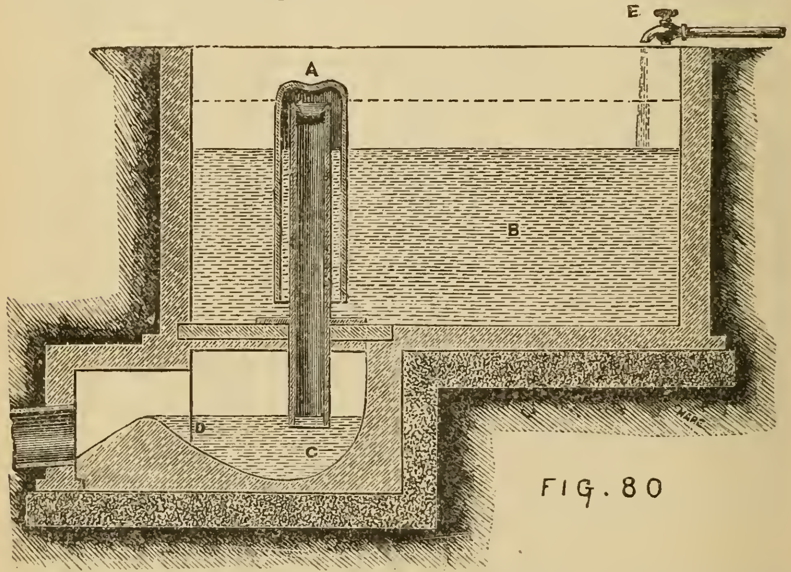


FIG. 80

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*And also for flushing town sewers, as at Memphis and other places.

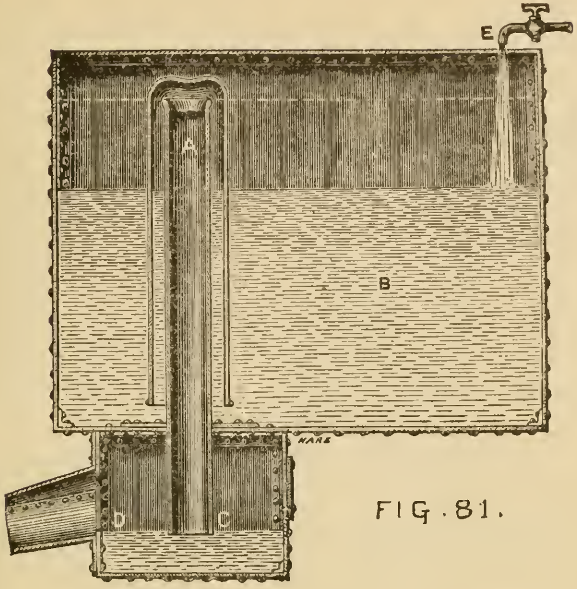


FIG. 81.

McFarland's tank is shown in Figs. 82 and 82a. It works by gravity, and is simply a bucket hung in a cistern, working in brass journals. As soon as filled by a faucet regulated to let the water in

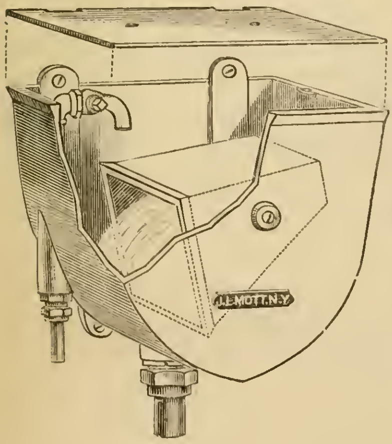


FIG. 82.

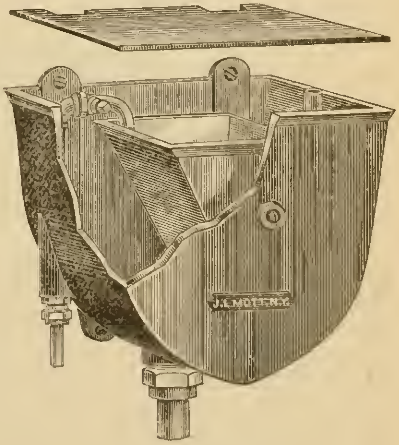


FIG. 82a.

slowly or quickly as desired, the bucket tips over and empties the entire contents at once. This tank is well adapted for flushing closets or urinals. Rogers Fields tank is preferred by many on account of its being free from all movable parts, but it is believed that the tilting tank can be constructed so as to well resist any wear or tear of the axis and journals.

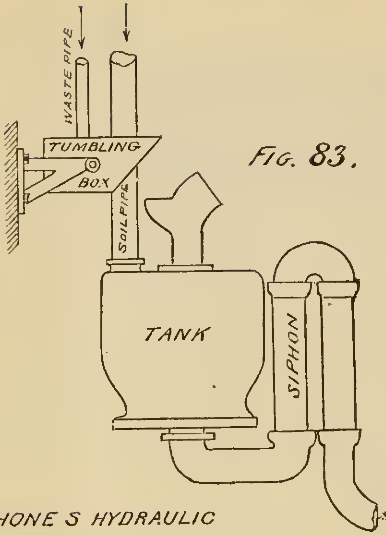


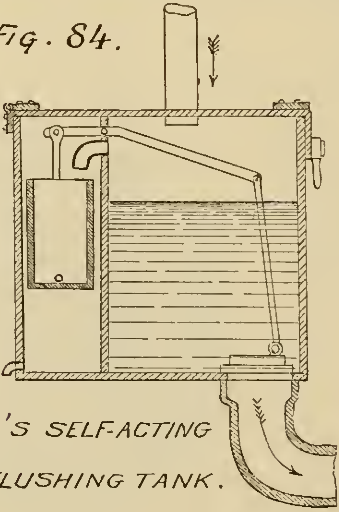
FIG. 83.

SHONE'S HYDRAULIC SIPHON EJECTOR.

Fig. 83 shows Shone's "Hydraulic Siphon Ejector," the invention of the English engineer Isaac Shone. It may be said to be a combination of a siphon tank and a tilting tank, and its working is readily understood from the illustration.

Fig. 84 shows Maguire's self-acting flushing tank, which is brought into action when the tank is filled by the overflow delivering into a vessel suspended on one arm of a lever, while to the other the outlet valve is attached. The weight of water in the vessel lifts the valve, the tank is discharged, and then the vessel empties its water through small outlet holes at its bottom. This tank is brought into action only by a sudden addition of a larger volume of water (same as Field's self-acting tank, Fig, 78).

FIG. 84.



MAGUIRE'S SELF-ACTING FLUSHING TANK.

CISTERNS.

These will be considered here only in so far as they have any connection with the drainage system. Both under-ground cisterns and cisterns in the attic of a house should be provided with an overflow. The usual custom has been to connect this overflow-pipe to the drain, or, if inside a house, to the soil-pipe. In consequence of this most pernicious practice the water was contaminated, and since water is known to be a carrier of disease germs not less so than the air, sickness and deaths were traced to this faulty arrangement.

No overflow from a cistern for cooking, washing or drinking water should be connected to any part of the drainage system under any circircumstances. Even if properly trapped the danger is not removed, as the water in this trap evaporates, and as an overflow seldom occurs, no water refills the trap and drain air passes freely into the tank. This overflow should be made to run into the gutter of the roof, wherever this is practicable. In cold climates or in exposed places its outlet should be protected by a flap-valve. If, for some reason, the above course cannot be followed, the overflow should discharge over an open sink in the basement or cellar. If the cistern is located outside of the house the overflow should be carried to some low point, where it should have an open outlet. Blow-offs for water-tanks should be treated similarly to the overflow-pipe.

Cisterns for storage of water, used for drinking and cooking purposes should never be used for flushing water-closets. In all cases the use of a special cistern for each closet or for a group of closets is recommended. The overflow from such cisterns should empty into the closet bowl.

REFRIGERATORS.

It is not safe to have a direct connection between a refrigerator waste and drain or soil pipes, for reasons given above for overflows of cisterns. Small refrigerators may waste into a pail to be removed and emptied periodically. Wastes from large refrigerators should empty over an open cup with a waste at its bottom, provided with a reliable mechanical trap and connected to the nearest soil pipe or drain.

SAFE WASTES.

In order to prevent the flooding of floors and ceilings, fixtures, such as wash-bowls, bath-tubs, water-closets, etc., are mostly lined with a safe of sheet lead, provided with a waste pipe. In bad plumbing work these "drip pipes" are either joined into the nearest soil or waste pipe—often even without a trap—or else, in the case of water-closet safes, are made to run into the water-closet trap. Such drip pipes should not be connected at all to the drainage system. They should run vertically downward to the cellar, and open either over a sink, or terminate at the cellar ceiling. Should it be feared that the drip pipes might become the channels for leading the cellar air into the upper rooms, their mouths should be closed with paper, glued over them, or the pipes should have an upward bend, closed by a ball, which is prevented from dropping by wire bands.

RAIN LEADERS.

Rain-water pipes may be of galvanized wrought iron, or of tin; when laid inside of a house they should be of cast iron and their joints treated in all respects as those of soil pipes. Before joining the house-drain they should be trapped, if such junction is made beyond the main running trap of the drain, and the trap of the leaders should be sufficiently deep in the ground to prevent its water from freezing. If rain leaders join the drain inside of the house they should not have a special trap. Sometimes a leader delivers into the main trap of the drain (Fig. 4) and thus helps to cleanse the trap.

Rain leaders should never be used as soil pipes nor should they be solely depended upon to ventilate the drain; and, on the other hand, soil pipes should never be used to carry rain water from the roof.

In making a sanitary examination of the Executive Mansion at Washington, under direction of Col. Geo. E. Waring, Jr., the writer had occasion to see an instance of the violation of this rule. The main soil pipe in the building was a 10-inch (!) cast iron pipe, which served the double purpose of receiving the discharge from three water-closets, a urinal, a slop sink and some wash-bowls and bathtubs, and also all the rain-water from the roof. At each rain-fall this large pipe received ample flushing, but in times of prolonged droughts its inner walls became thoroughly slimed and foul with excremental and other matter. In times of violent rainstorms the water rushing down the 10-inch pipe and passing the branch wastes, very likely siphoned all water out of the traps, thus leaving the house unprotected against the foul gases of the soil pipe.

DRAINAGE OF CELLARS.

It remains to discuss the proper method of removal of excessive moisture from the soil under and around a dwelling. Unless this is properly attended to cellars of houses will be continually damp, the brick or stone walls will readily absorb the moisture by capillary attraction and an excess of watery vapor will fill the house. The well-known researches of Dr. Bowditch of Massachusetts, and of Dr. Buchanan in England, have clearly established the relation of excessive soil moisture to certain diseases, notably *consumption*, bronchitis, pneumonia and other diseases of the lungs.

Dr. Parkes, in his admirable "Manual of Practical Hygiene" speaks about diseases connected with moisture and ground-water as follows: "Dampness of soil may presumably affect health in two ways—(1) by the effect of the water, *per se*, causing a cold soil, a misty air, and a tendency in persons living on such a soil to catarrh and rheumatism; and (2) by aiding the evolution of organic emanations. The decomposition which goes on in a soil is owing to four factors, viz: presence of decomposable organic matters (animal or vegetable), heat, air and moisture. These emanations are at present known only by their effects; they may be mere chemical agencies, but more probably they are low forms of life which grow and propagate in these conditions. At any rate, moisture appears to be an essential element in their production. The ground-water is presumed to affect health by rendering the soil above it moist, either by evaporation or capillary attraction, or by alternate wettings and dryings. A moist soil is cold, and is generally believed to predispose to rheumatism, catarrh and neuralgia. It is a matter of general experience that most persons feel healthier on a dry soil."

In order to keep the level of the sub-soil water below a certain depth artificial channels should be provided, laid at that depth and sloping towards some proper outlet which will remove all surplus water. These channels, which carry off only clean water, are also called *drains* (this being the original meaning of the word).

Under the foundation walls of the house trenches dug for this purpose should be filled with loose or broken stones. Drains (common tiles) should be placed two or three feet below and under the cellar floor, with open joints, care being taken to prevent any intrusion of earth at the joints.

The only difficulty, from a sanitary point of view, consists in finding a proper outlet. If the house is a country residence with ample ground around it, and especially if the land is not level, but slopes to some distant valley or creek, it is very easy to continue the main cellar drain with a sufficient pitch to some gutter or open ditch, into which it may discharge.

The case becomes difficult with city houses, on narrow lots, with no other outlet available but the sewer under the street. A direct connection between the cellar drain and the sewer is forbidden for well-known reasons, and even the interposition of a water-seal trap may not be regarded as a sufficient safeguard, for during periods of droughts the water evaporates, allowing the gases from the sewer to pollute the ground under the house.

The drain should run into a mason's trap with *deep* water-seal and filled with coarse sand or fine gravel, and before joining the sewer the drain should be trapped by a running trap, into which, if practicable, a leader should discharge. Another arrangement is to trap the cellar drain, and to provide an outlet for gases which may force the trap, by a vertical pipe, on the house side of the trap, and opening on the surface of the ground. This is sometimes done, when the sewer is in an alley at the rear of the house, and an open yard gully may be connected to the vertical vent pipe to supply the running trap with water.

Fig. 85 shows a method of draining cellars of city houses, as recommended by the "Sanitary Engineer," Vol. 4, and explained thus as follows: "Where houses are built in continuous blocks, as in cities, the arrangement shown is appropriate. In this case the pipe under the basement or sub-cellar floor should be of unglazed tiles, laid without mortar of any kind, so that the ground water can get in at any joint, perhaps it is not a tight drain, but a porous one, for clean water only, it need not be made easy of access, but can be closed. Some people connect the ground drain under the water with the outer trap, but it is not so good a plan as the one shown in the cut, for the following reason: In that case the trap water sets back into the ground drain and stands there without circulation, except at such rare intervals as the ground drain is in active use. This occurs so seldom, that the opening where it discharges into the trap is liable to get closed up by fæcal matter and other substances which pass by the orifice, and the ground drain has generally insufficient fall to enable its contents to crowd through such a pasty plug and clean itself. The longer this plug remains, the more compact it becomes.

During the winter season, and as long as houses are heated by fires, there is always an inward pressure of air at all cracks and orifices near the basement, and the air which is in these ground drains will at such times press upward through any pores and channels that can be found in the cellar floor, gradually and surely working its way into the house. The ground drain is deeply covered and inaccessible, so that if by any chance it becomes defiled by sewage, it is next to impossible to clean it. It is, therefore, *very* important that these ground drains should be kept quite free from any possible contamination where connecting with the sewage drain.

It is generally advisable to put the ground drains as deep as two or three feet below the cellar floor wherever an outlet can be found at such a level, and this generally precludes the possibility of getting much fall where these ground drains enter the main house drain.

In consequence of this condition of things, a very slight obstruction in the house drain trap, such as may happen from the deposit of a bit of cloth, a broken tea-cup or tumbler in any water closet above, by a servant who thinks water-closets are made to hide such things, would serve to back up all the sewage of the house into the ground drain, if care is not taken to prevent such an event.

If arranged as shown in the plan above, a stoppage in the main trap

Fig. 85.

A—Vault with perforated man-hole cover.

B—Main trap with open end.

C—Ball valve trap on the tile drain, as described in the text.

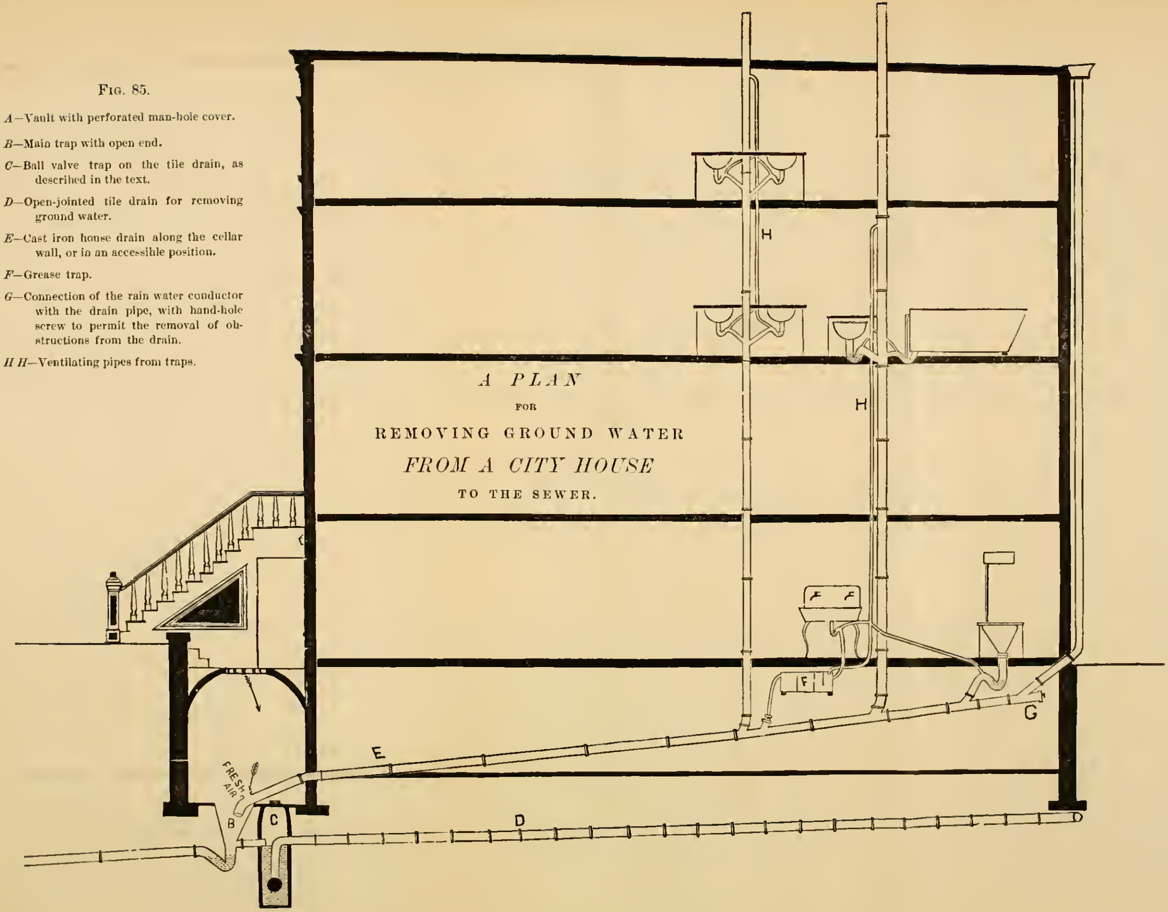
D—Open-jointed tile drain for removing ground water.

E—Cast iron house drain along the cellar wall, or in an accessible position.

F—Grease trap.

G—Connection of the rain water conductor with the drain pipe, with hand-hole screw to permit the removal of obstructions from the drain.

H H—Ventilating pipes from traps.



A PLAN

FOR

REMOVING GROUND WATER

FROM A CITY HOUSE

TO THE SEWER.

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would cause an overflow in the man-hole, which should be inspected frequently and can be cleaned out when occasion requires. But if, as may often happen, it is not possible to get fall enough to prevent such a stoppage backing up the sewage into the ground drain, some special safeguard must be applied in the shape of a mechanical valve. Such valves are not to be generally recommended in pipes where sewage flows, but this ground drain is supposed to carry nothing but clean water. Under such conditions a valve may answer a good purpose. Metal valves, and even brass ones, are subject to corrosion, which would seal them fast to their seats if not often lifted.

A good form for this place is a rubber ball valve arranged as in Bower's trap. But the trap should be specially constructed for this purpose, with a seal of at least twelve inches depth. The clearing screw should of course be on top instead of at the bottom in this case, and should be examined for removal of sand or silt which the water may possibly bring in, especially during the first flow after the drain is constructed. The space around this trap where the water enters it, should be well grouted with hydraulic cement to prevent any back flow outside the pipe, in case of obstruction of sewage, while the valve in the trap will prevent it on the inside. Such a trap in such a position will hold its water for years, but *should be inspected at least twice a year, because it is of great importance to keep it free from sand and supplied with water.*

If the connection with the main drain were to be made beyond the trap in the latter, we should lose the additional safeguard of that trap against the admission of sewer air, which safeguard it is best to retain.

It is equally important to have a dry, impervious floor in the cellar, which can be secured by first laying a base of concrete, upon which a layer of about ½-inch of asphaltum should be placed. This makes the floor practically impervious. It should then be properly finished with a layer of best Portland cement.

In order to prevent dampness of walls, that part of the wall below the level of the ground should be executed with particular care. Nothing will better prevent dampness in walls than a "damp course" of some impervious material. Asphaltum is probably best for this purpose, though layers of slate in concrete or damp proof tiles are very efficient. If at all practicable there should be a dry area all around the foundation walls in order to prevent any dampness in the walls originating from the earth surrounding it at the sides. If such an area cannot be provided a *double* wall with an air-space between inner and outer wall should be used.

APPENDIX.

CALCULATION OF VELOCITY AND DISCHARGE OF HOUSE DRAINS AND SEWERS.

The problem of determining the size of a drain or pipe intended to discharge sewage, is strictly a question of hydraulics, and its solution is readily accomplished by means of formulæ and calculations, or by tables, worked out so as to facilitate arithmetic operations.*

It is, however, often desirable to have the relation between inclination, size, velocity and discharge of a drain or sewer in a shape, which may permit at a glance finding two of the above quantities if the other two are given.

A diagram constructed so as to illustrate the relation of these four quantities, will best serve for this purpose, and the annexed graphical solution of the problem (for whose suggestion the writer is under obligations to M. L. Holman, Esq., Assistant Engineer, St. Louis Waterworks) is offered to meet such a want.

This diagram is based upon Baldwin Latham's Tables, calculated from Weisbach's formula

$$v = \frac{\sqrt{2gh}}{\sqrt{1 + e + c\,\frac{l}{d}}}\,, \quad \text{wherein}$$

h = head of water in feet.
l = length of sewer in feet.
d = diameter of sewer in feet.
v = velocity in feet per second.
c = coefficient for friction in pipes.
e = coefficient of resistance for entrance.
g = acceleration of gravity = 32.2.

The coefficient *e* may be assumed according to Weisbach as = .505 in the average.

The coefficient *c* is somewhat variable with the square root of the velocity, viz:

$$c = .01439 + \frac{.016921}{\sqrt{v}}$$

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* Very complete tables of the velocities and discharges of sewers are given in Baldwin Latham's "Sanitary Engineering."

With a velocity v and the diameter d the discharge Q is accordingly found by the formula:

$$Q = v \times \frac{d^2}{4}\pi$$

Q being discharge in cubic feet per second, the sewer running full. If we assume the sewer running only *half-full* the discharge *per minute* becomes

$$Q = \frac{1}{2} v \times 60 \times \pi \frac{d^2}{4}$$

Diagram I. gives discharges per minute, the sewer running *half-full,* and this limit of depth of flow is usually assumed for house drains and small sewers. But the velocity is the same for sewers running full or half-full (being proportionate to $\frac{\text{sectional area of water-way}}{\text{wetted perimeter}}$, which has the same value for both cases), consequently, the discharge Q for sewers running full is simply double the value given in the diagram.

For other depths of flow, the velocity should be calculated from Weisbach's formula for flow of water in open culverts:

$$v = \sqrt{\frac{T}{p} \frac{h}{l} \frac{2g}{\zeta}} \text{ , in which}$$

v = mean velocity in feet per second.
T = area of the cross-section of water in sq. ft.
p = the wetted perimeter in ft.
h = the fall in ft. in the distance l (in ft.)
g = acceleration of gravity, 32.2.
ζ = empirical coefficient of friction, which is somewhat dependent from the velocity, but may, for approximative calculations, be assumed as = .0075.

Tables 1 and 2 were calculated by Robt. Moore, C. E., from this last formula.

It will be seen that, assuming ζ as a constant, the velocity v is proportionate to $\sqrt{\frac{T}{p}}$, or to the square root of the hydraulic mean radius. It is evident that the velocity in a circular culvert (drain or sewer) will greatly diminish as the depth of the stream flowing through it decreases. Diagram II. illustrates this change of velocity for different depths of flow. It shows that the velocity is the same for drains running full or half-full; it further shows that the maximum velocity of flow occurs not when the sewer is running full, but when the depth of flow is about .813 of its diameter. The maximum velocity is about 11 per cent. greater than when running full or half-full.* At a depth of flow of $\frac{1}{4}$ of the diameter the velocity is only about 77 per cent.

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*The maximum discharge does not coincide with the maximum velocity. Q is a maximum when the depth of flow is about .95 of the diameter.

of that when running full or half-full, and for lesser depths of flow the velocity diminishes rapidly.

This diagram is well adapted to illustrate the advantage gained by reducing the sizes of drains as much as possible, or in other words, by concentrating the sewage flowing through it.

In order to illustrate the use of Diagram I. examples are given for various cases.

Problem 1.—Given the inclination of a sewer to be 1 in 250, and the discharge (if running half-full) 200 cubic feet per minute, what will be the diameter of the sewer and what the velocity of flow in it?

Answer.—Turning to the diagram, and following the two curves Q and i, to their point of intersection, we find, by going from this point horizontally to the end of the line, the required size to be 17.75 inches diameter, and by going vertically upwards we find the velocity to be about 3.9 feet per second.

If the same discharge should be effected by a sewer running *full*, we divide first Q by 2, and look into the diagram for the intersection of i=1 in 250 and Q=100 cubic feet. In this case the required size would be d=13.5 inches, and the velocity v=about 3.35 feet per second.

Problem 2.—How much water does a 6-inch house-drain deliver per minute, running half-full, and laid at an inclination of 1 in 100, and what would be the velocity of the water?

Answer.—The intersection of the horizontal line at the diameter 6 inches and the inclination curve 1 in 100 falls between the curves Q=20 and Q=30, and is found by interpolation to be about 21 cubic feet per minute. By going vertically upward from the point of intersection, we find the velocity to be a little over 3.5 feet per second.

Problem 3.—What is the size of pipe necessary to deliver 40 cubic feet per minute (running half-full) with a velocity of 3 feet per second, what inclination should be given to the pipe?

Answer.—At the intersection of the curve Q=40 and the vertical line v=3 feet, we find the diameter=9 inches, and the inclination between 1 in 200 and 1 in 250, say 1 in 210.

Problem 4.—How much water will a 12-inch pipe, the flow being at the rate of 2.5 feet per second, running half-full, discharge per minute? What inclination should it have?

Answer.—The intersection of the vertical lines $v=2.5$ and horizontal line $d=12$-inches gives the discharge to be between $Q=50$ and 60, say 58 cubic feet per minute, and the grade to be between 1 in 350 and 1 in 400, say 1 in 380.

Problem 5.—Given $Q=400$ cubic feet per minute, $d=24$ inches, what is i and v ?

Answer.—The intersection of $Q=400$ and $d=24$ falls between the inclination curves $i=1$ in 250, and 1 in 300, by interpolation $i=1$ in 280. The velocity is found by going from the point of intersection vertically upward; it is $v=4.25$ feet per second.

Problem 6.—Given $v=3$ feet per second, $i=1$ in 90, what is d and Q?

Answer.—The intersection of the vertical line $v=3$ and the curve $i=1$ in 90, gives Q between 5 and 10, say about 8 cubic feet per minute, and the diameter to be very nearly 4 inches.

Table 1.

TABLE OF DIAMETERS OF HOUSE DRAINS

With various Grades, and for Lots of different sizes, capable of discharging 2 inches of rain per hour when running three-fourths full.

Calculated by Robt. Moore, C. E., St. Louis, Mo.

Dimensions of Lot in Feet.	No. of Acres.		Fall 1 per 100	Fall 1½ per 100	Fall 2 per 100	Fall 2½ per 100	Fall 3 per 100	Fall 4 per 100	Fall 5 per 100
20x150	0.0689	Velocity	2.69	3.16	3 54	3.87	4.17	4.68	5.11
		Diam. Ft.	.286	.263	.249	.238	.229	.216	.207
		" Inches	3½	3⅛	3	2⅞	2¾	2⅝	2½
25x150	0.0861	Velocity	2.81	3 30	3.71	4.05	4.36	4.89	5.35
		Diam. Ft.	.312	.288	.272	.260	.251	.237	.226
		" Inches	3¾	3½	3¼	3⅛	3	2⅞	2¾
30x150	0.1033	Velocity	2.91	3.43	3.84	4.20	4.52	5.07	5.54
		Diam. Ft.	.336	.310	.292	.280	.270	.254	.243
		" Inches	4	3¾	3½	3⅜	3¼	3	3
35x150	0.1205	Velocity	3.00	3.53	3.96	4.33	4.66	5.23	5.72
		Diam. Ft.	.357	.329	.311	.297	.287	.271	.259
		" Inches	4¼	4	3¾	3⅝	3½	3¼	3⅛
40x150	0.1377	Velocity	3.09	3.59	4.07	4.45	4.79	5.37	5.87
		Diam. Ft.	.377	.347	.328	.314	.302	.286	.273
		" Inches	4½	4¼	3⅞	3¾	3⅝	3½	3¼
45x150	0.1550	Velocity	3.16	3.71	4.17	4.56	4.90	5.45	6.01
		Diam. Ft.	.395	.364	.344	.329	.317	.299	.286
		" Inches	4¾	4⅜	4⅛	4	3⅞	3⅝	3½
50x150	0.1722	Velocity	3.23	3.79	4.26	4.65	5.01	5.62	6.14
		Diam. Ft.	.412	.380	.359	.345	.331	.312	.299
		" Inches	5	4½	4¼	4⅛	4	3¾	3⅝
60x150	0.2066	Velocity	3.35	3.93	4.41	4.88	5.19	5.83	6.37
		Diam. Ft.	.443	.409	.386	.369	.356	.336	.321
		" Inches	5⅜	4⅞	4⅝	4⅜	4¼	4	3⅞
70x150	0.2410	Velocity	3.45	4.06	4.55	4.98	5.35	6.01	6.57
		Diam. Ft.	.471	.435	.410	.392	.378	.357	.342
		" Inches	5⅝	5¼	4⅞	4¾	4½	4¼	4⅛
80x150	0.2755	Velocity	3.54	4.17	4.68	5.11	5.50	6.17	6.75
		Diam. Ft.	.497	.458	.433	.414	.399	.378	.360
		" Inches	6	5½	5¼	5	4⅞	4½	4⅜
90x150	0.3099	Velocity	3.63	4.27	4.79	5 23	5.63	6.32	6.91
		Diam. Ft.	.521	.480	.454	.434	.418	.395	.378
		" Inches	6¼	5¾	5½	5¼	5	4¾	4½
100x150	0.3443	Velocity	3.71	4.36	4.89	5.35	5.75	6.45	7.05
		Diam Ft.	.544	.501	.473	.453	.436	.412	.394
		" Inches	6½	6	5¾	5½	5¼	5	4¾
125x150	0.4304	Velocity	3.87	4.56	5.11	5.59	6.01	6.75	7.38
		Diam. Ft.	.594	.548	.517	.495	.477	.450	.431
		" Inches	7⅛	6½	6¼	6	5¾	5⅜	5⅛
150x150	0.5165	Velocity	4.02	4.73	5.30	5.80	6.24	7.00	7.65
		Diam. Ft.	.639	.589	.556	.532	.513	.484	.463
		" Inches	7⅝	7⅛	6⅝	6⅜	6⅛	5⅞	5⅝
175x150	0.6026	Velocity	4.14	4.87	5.47	5.99	6.45	7.22	7.89
		Diam. Ft.	.680	.627	.592	.569	.546	.515	.493
		" Inches	8⅛	7½	7⅛	6⅞	6½	6¼	6
200x150	0.6887	Velocity	4.26	5.06	5.62	6.14	6.61	7.41	8.10
		Diam. Ft.	.717	.661	.624	.597	.576	.544	.520
		" Inches	8⅝	8	7½	7⅛	6⅞	6½	6¼

Formulae—$v = \left(\frac{19429}{769}\,hd.\right)^{1/2}$ $d = \left(\frac{4n^2}{10h}\right)^{1/5}$

d = Diameter in feet; v= Velocity; n= No. of Acres; h= Fall per 100 feet.

TABLE 2.—DIAMETERS OF SEWERS

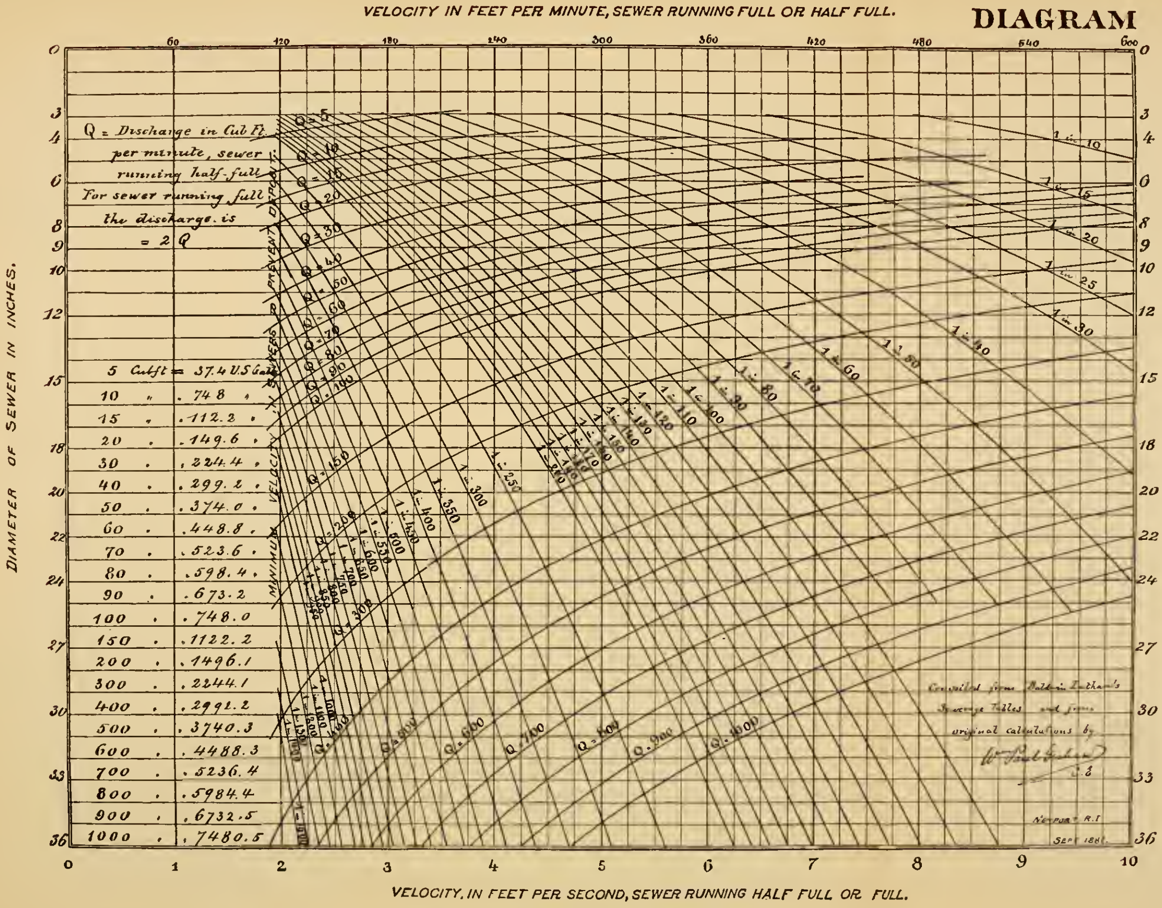
Capable of Discharging 50 gallons per front foot, or 1250 gallons per house (25 front feet), per day when running three-fourths full.
Calculated by ROBT. MOORE, C. E., St. Louis, Mo.

No. Front Foot.	FALL OF SEWER PER 100 FEET.																	No. of Houses.
	.2	.4	.6	.8	1.0	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	
100	.124	.108	.100	.094	.090	.086	.083	.081	.078	.077	.075	.074	.072	.071	.070	.069	.068	4
200	.164	.143	.132	.124	.119	.114	.110	.106	.103	.101	.099	.097	.095	.094	.093	.091	.090	8
300	.193	.168	.155	.146	.140	.134	.129	.125	.122	.119	.116	.114	.112	.110	.109	.107	.106	12
400	.216	.188	.174	.164	.157	.150	.145	.140	.137	.133	.131	.128	.126	.124	.122	.120	.119	16
500	.237	.206	.190	.179	.172	.164	.158	.153	.149	.146	.143	.140	.138	.135	.133	.132	.130	20
600	.255	.222	.204	.193	.184	.176	.170	.165	.161	.157	.154	.151	.148	.146	.144	.142	.140	24
700	.271	.236	.217	.205	.196	.188	.181	.175	.171	.167	.163	.160	.158	.155	.153	.151	.149	28
800	.286	.247	.229	.216	.207	.197	.191	.185	.180	.176	.172	.169	.166	.164	.161	.159	.157	32
900	.299	.261	.240	.227	.217	.207	.200	.194	.189	.184	.181	.177	.174	.171	.169	.167	.164	36
1,000	.312	.272	.251	.237	.226	.216	.209	.202	.197	.192	.188	.185	.182	.179	.176	.174	.171	40
2,000	.412	.359	.331	.312	.299	.286	.275	.267	.260	.254	.249	.244	.240	.236	.232	.229	.226	80
3.000	.485	.422	.389	.367	.351	.336	.324	.314	.306	.299	.292	.287	.282	.277	.273	.270	.266	120
4,000	.544	.473	.437	.412	.392	.377	.363	.352	.343	.335	.328	.322	.316	.311	.307	.302	.299	160
5,000	.594	.522	.477	.450	.431	.412	.397	.385	.375	.366	.359	.352	.346	.340	.335	.331	.326	200
6.000	.639	.557	.513	.485	.463	.443	.427	.414	.403	.394	.386	.378	.372	.366	.361	.356	.351	240
7,000	.680	.592	.546	.515	.493	.471	.454	.441	.429	.419	.410	.403	.396	.389	.384	.378	.374	280
8.000	.717	.624	.576	.544	.520	.497	.479	.465	.453	.442	.433	.425	.417	.411	.405	.399	.394	320
9,000	.752	.655	.604	.570	.545	.521	.503	.487	.474	.463	.454	.445	.437	.431	.424	.418	.413	360
10,000	.784	.683	.630	.594	.568	.544	.524	.508	.495	.483	.473	.464	.456	.449	.442	.436	.431	400
20,000	1·035	.901	.831	.784	.750	.717	.692	.671	.653	.638	.624	.613	.602	.593	.584	.576	.568	800
30,000	1.217	1.060	.977	.922	.882	.844	.813	.789	.768	.750	.734	.721	.708	.697	.687	.677	.668	1,200
40,000	1.365	1.189	1.096	1.035	.990	.946	.913	.885	.862	.841	.824	.808	.794	.782	.770	.760	.750	1,600
50,000	1.493	1.312	1.198	1.131	1.082	1.035	.998	.967	.942	.920	.901	.884	.869	.855	.842	.831	.820	2,000
60,000	1.606	1.398	1.289	1.217	1.164	1.113	1.073	1.041	1.013	990	.969	.951	.934	·919	.906	.894	.882	2,400
70,000	1.708	1.487	1.371	1.294	1.238	1.184	1.142	1.107	1.078	1.053	1.031	1.011	.994	.978	.964	.950	.938	2,800
80 000	1.802	1.569	1.446	1.366	1.306	1.249	1.204	1.168	1.137	1.110	1.087	1.067	1.048	1.032	1 017	1.003	.990	3,200
90,000	1.889	1.644	1.516	1.431	1.366	1.309	1.262	1.224	1.192	1.164	1.140	1.118	1.099	1.081	1.066	1.051	1.037	3,600
100,000	1.970	1.715	1.581	1.493	1.428	1.366	1.317	1.277	1.243	1.214	1.189	1.166	1.146	1.128	1.111	1.096	1.082	4,000

FORMULA, $d = \left(\frac{n^2}{h} . \log^{-1} 0.7732933\text{-}10 \right)^{1/5} = \frac{1}{70} \left(\frac{n^2}{h} \right)^{1/5}$

d = Diameter in feet. n = Number of front feet. h = Fall per 100 feet.

DIAGRAM I.



Compiled from Baldwin Latham's Sewerage Tables and from original calculations by

W. Paul Gerhard C.E.

Newport R.I.

Sept 1881.

TABLE 2.—DIAMETERS OF SEWERS

Capable of Discharging 50 gallons per front foot, or 1250 gallons per house (25 front feet), per day when running three-fourths full.
Calculated by ROBT. MOORE, C. E., St. Louis, Mo.

DIAGRAM II.

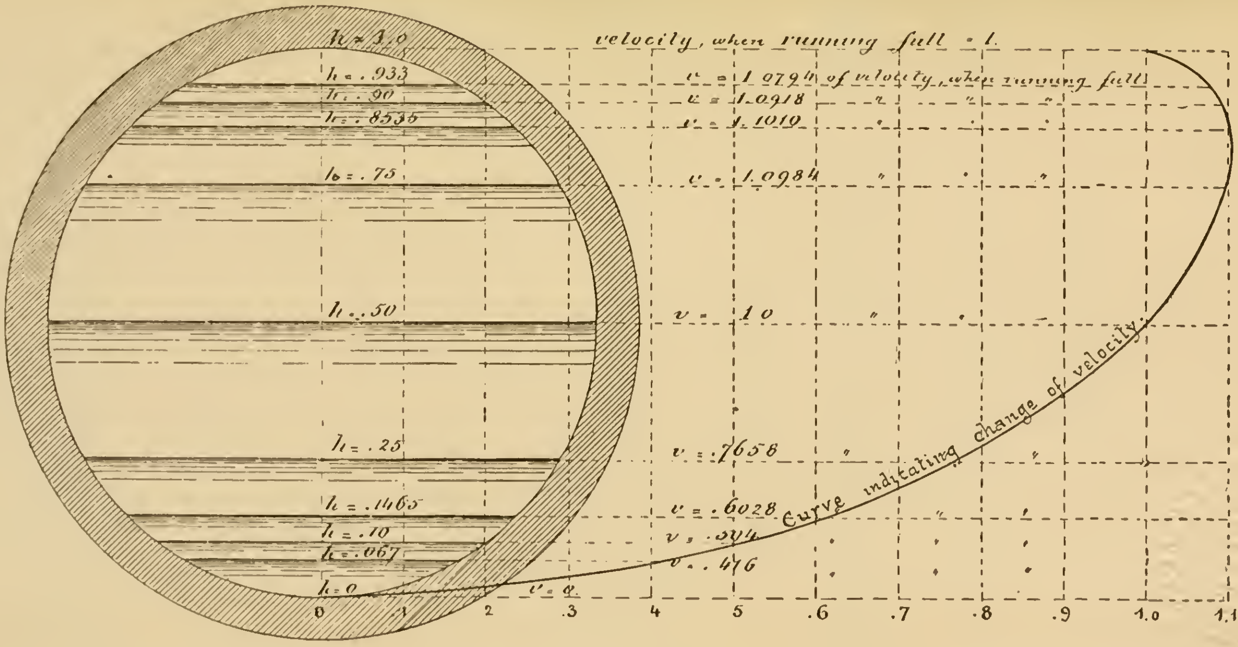


DIAGRAM REPRESENTING CHANGES OF VELOCITY IN A CIRCULAR SEWER OF THE DIAMETER = 1, LAID AT A GIVEN GRADE, AT DIFFERENT DEPTHS OF FLOW

W.P. GERHARD, C.E. 1881.

APPENDIX.

THE LAWS OF RHODE ISLAND

IN RELATION TO

Vital Statistics, the State Board of Health, and Marriage.

PUBLIC STATUTES CHAPTER 85.

OF THE REGISTRATION OF BIRTHS, DEATHS AND MARRIAGES.

Section 1. The town clerks of the several towns, or any person whom the board of aldermen of any city, or the town council of any town may appoint for that purpose, shall obtain chronologically record and index, as required by the forms prescribed by section three of this chapter, all information concerning births, marriages and deaths occurring among the inhabitants of their respective towns; and on or before the first Monday in March, annually, shall make duly certified returns thereof to the secretary of the state board of health for the year, ending on the thirty-first day of December next preceding, accompanying the same with a list of the persons required by law to make returns to them, who have neglected to do so, and with such remarks relating to the object of this chapter as they may deem important to communicate.

Sec. 2. The Secretary of the state board of health shall receive the returns made in pursuance of the preceding section, and annually, make a general abstract and report thereof, in form as prescribed by section three of this chapter, and publish not exceeding one thousand copies thereof. Said returns, after such report is prepared, shall be deposited in the office of the secretary of state, who shall cause the same to be arranged, full alphabetical indices of all the names to be made, and the whole to be bound in volumes of convenient size, and carefully preserved in his office.

Sec. 3. The blank forms required to carry out the provisions of this chapter, shall, on application, be furnished by the secretary of the state board of health to clergymen, physicians, undertakers, town clerks, clerks of meetings of the Society of Friends and other persons requiring them, substantially as follows: The record of a birth shall state the date and place of birth, name and sex of the child, whether born alive or still-born, the name and surname, color, occupation, residence and birthplace of the parents, and the time of recording, so far as the same can be ascertained. The record of a marriage shall state the date of the marriage, place, name, residence and official station of the person by whom married, names and surnames of the parties, age, color, occupation and residence of each, condition, that is whether single or widowed, what marriage, that is whether first, second, third or other marriage, the occupation, birthplace and name of their parents, and the time of recording, so far as the same can be ascertained. The record of deaths shall state the date of death, name and surname of deceased, the sex, color and condition, whether single or married, age, occupation, place of death, place of birth, names and birthplace of parents, disease, or cause of death, and the time of recording, so far as can be ascertained.

Sec. 4. Every meeting of the Society of Friends, clergyman, and all others authorized to join persons in marriage, shall make a faithful record of every such rite performed by them, in manner and form aforesaid, and return the same for the last preceding month, on or before the second Monday of every month, to the town clerk of the town in which such rite shall have been performed; and no marriage shall be solemnized until the parties shall have signed and delivered to the person about to solemnize it, or to the clerk of a meeting of the Society of Friends, a certificate containing the information required for the record of a marriage, as prescribed by this chapter.

Sec. 5. The town clerk of every town shall annually, in the month of January, collect the information required by this chapter, in relation to all children born in the town during the year ending on the thirty-first day of December next preceding.

Sec. 6. Whenever any person shall die, or any still-born child shall be brought forth in this State, the physician attending at such bringing forth or last sickness, if any physician so attended, shall within forty-eight hours after such death or bringing forth, leave with the family, if any, or person having the care of the deceased, or the person bringing forth such still-born child, or give to the undertaker or person who conducts the funeral, a certificate stating in case of a death the name of the deceased, the date of the death, and the disease or cause of the death, and in case of the bringing forth of a still-born child, the date and the cause of such child being brought forth still-born.

Sec. 7. Every town council may appoint a sufficient number of persons to act as undertakers, removable at the pleasure of such council.

Sec. 8. No undertaker or other person shall conduct a funeral, or bury or deposit in a tomb, or remove from this State or otherwise dispose of the remains of any deceased person or still-born child, unless he shall first obtain the physician's certificate required by section six of this chapter, if a physician was in attendence upon such person who has deceased, or the person bringing forth such still-born child, and shall return the same, together with his own certificate of the information required by section three of this chapter, to the town clerk of the town where such death or bringing forth took place.

Sec. 9 Any town may make ordinances, more effectually to attain the objects herein contemplated.

Sec. 10. The town clerks, or persons appointed as aforesaid, shall receive for each record of a death made and returned as required by law, and for each record of a marriage made and returned as required by law, twenty cents, to be paid to them out of their respective town treasuries: *Provided*, that the yearly compensation to be paid out of the town treasury as aforesaid, to any one town clerk or person appointed as aforesaid, who shall perform the duties prescribed by this chapter, shall not be less than five dollars. Undertakers and others making returns of deaths as required by section eight of this chapter, shall receive for each full report of a death made to the town clerk, five cents, in the cities of Providence and Newport, and ten cents in the other towns of the State.

SEC. 11. Every clergyman, physician, undertaker, town clerk, clerk of any meeting of the Society of Friends, or other person, who shall wilfully neglect or refuse to perform any of the duties imposed on, or required of him, by this chapter, shall be fined not exceeding twenty dollars for each offence, one half thereof to the use of the town in which the offence shall occur, and one half thereof to the use of the person who shall complain of the same.

SEC. 12. Every clergyman, physician, coroner, undertaker or clerk of any meeting of the Society of Friends, shall cause his name and residence to be recorded in the town clerk's office of the town where he resides.

SEC. 13. No letters of administration or letters testamentary shall be granted by any court of probate, upon the estate of any person, until the death of such person, or the facts from which the same is presumed, shall be duly certified, as near as may be, to the town clerk, in order that the same may be duly registered according to the provisions of this chapter.

SEC. 14. The town clerks of the several towns, the city clerk of the city of Newport, and the city registrar of the city of Providence, shall have the custody of all records of births, deaths and marriages of their respective towns, whether made under the statutes now in force or any former statute, and a certificate signed by them, certifying that any written or printed statement of any marriage, birth or death is a true copy of the record in their custody, shall be admitted as evidence of such marriage, birth or death.

SEC 15. Births, marriages and deaths of non-residents shall be distinguished from those of residents in the returns, by being arranged separately.

SEC. 16. The secretary of the state board of health may, from time to time, vary the forms of returns, and require such additional information as he may consider necessary to accomplish the object of this chapter.

SEC. 17. The town clerks or other officers appointed under this chapter to collect, record and return the births in the several towns, shall receive fees therefor as follows: For making record and return of these facts as required by law, twenty cents each for the first fifty entries in each calendar year, and ten cents each for each subsequent entry and return; to be paid by the town in which the birth is recorded.

SEC. 18. The town clerks of the several towns, or other persons appointed under this chapter to collect the births in the several towns, shall annually in the month of January, collect the facts concerning the births within their respective towns, required by this chapter; and shall so far as practicable, at the same time collect the names of all persons liable to be enrolled in the militia, as required by title thirty-four; and the census of all persons between the ages of five and fifteen years inclusive, as provided by chapter fifty; and shall receive therefor such compensation as the town council or the board of aldermen of their respective towns or cities shall determine: *Provided*, that the city of Providence shall be exempt from so much of the provisions of this section as relates to the collection of the statistics of births.

SEC. 19. Blanks for the foregoing purposes shall be furnished, on application therefor, on or before the first day of December in the year preceding, by the state board of health, for the collection of births, by the adjutant-general, for the taking of the enrolled militia, and by the commissioner of public schools, for the census aforesaid.

SEC. 20. The person or persons who shall discharge the duties required by section eighteen of this chapter, if other than the town clerk, shall make full return thereof to the town clerk of his or their town, on or before the tenth day of February next following.

SEC. 21. The returns required to be made by clerks of the supreme court, in relation to divorces, to the secretary of the state board of health, or a prepared abstract thereof, shall be published in the annual report on the births, marriages and deaths in the State.

CHAPTER 198.

OF DIVORCES.

SECTION 5. The clerks of the supreme court in the several counties, shall make returns to the secretary of the state board of health, on or before the first day of March, in each and every year, for the year ending on the thirty-first day of December preceding, of all the applications for divorce, showing the number, the number granted, and the causes which are given for the application, but without the names of the parties, in accordance with the blanks which shall be furnished them by the secretary of the state board of health.

CHAPTER 83.

OF THE STATE BOARD OF HEALTH.

SECTION 1. The governor, with the advice and consent of the senate, shall appoint six persons, two from the county of Providence, and one from each of the other counties, who shall constitute the state board of health, one of whom shall be appointed in each year for the term of six years from the first day of July. Any appointment to fill a vacancy shall be for the remainder of the term. Of the persons so appointed, at least three shall be well educated physicians and members of some medical society incorporated by the state. The governor may remove any member for cause, at any time, upon the written request of two-thirds of the board.

SEC. 2. The board shall take cognizance of the interests of life and health among the citizens of the state. They shall make investigations into the causes of disease, and especially of epidemics and endemics among the people, the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health, and shall faithfully do all in their power to ascertain the causes and the best means for the prevention of diseases of every kind in the state. They shall publish and circulate, from time to time, such information as they may deem to be important and useful for diffusion among the people of the state, and shall investigate and give advice in relation to such subjects relating to the public health, as may be referred to them by the general assembly, or by the governor when the general assembly is not in session.

SEC. 3. The state board of health shall also investigate the subject of diseases among cattle or other animals.

SEC. 4. The board shall meet in the city of Providence once in three months, and as much oftener as they may deem necessary. No member of the board, except the secretary, shall receive any compensation for his services; but the actual personal expenses of any member, while engaged in the duties of the board, shall be paid by the state.

Sec. 5. The board shall elect a well qualified physician as their secretary, who shall be *ex-officio* a member of the board, the commissioner of public health, and state registrar, but he shall not be permitted to vote on any question in which he is personally interested, or be entitled to any additional compensation for mileage or expenses.

Sec. 6. The secretary of the said board shall make inquiry from time to time, of the clerks of town and local boards of health, and practicing physicians, in relation to the prevalence of any disease, or knowledge of any known or generally believed source of disease, or causes of general ill-health, and also in relation to the proceedings of the said boards of health, in respect to acts for the promotion and protection of the public health, and also in relation to diseases among domestic animals in their several towns and localities respectively; and the said clerks of town and local boards of health, and the said practising physicians, shall give such information, in reply to said inquiries, of such facts and circumstances as shall have come to their knowledge.

Sec. 7. The secretary shall perform and superintend the work prescribed for said board by law, and such other duties as the board may require, and he shall receive such salary not in excess of twelve hundred dollars annually, as the board may determine. He shall hold his office during the pleasure of the board, and may be removed at any regular meeting, by a majority vote of the members thereof.

Sec. 8. The governor shall provide a suitable office for the board in the city of Providence, and the actual expenses of the board and of the members thereof, when certified by the chairman and approved by the governor, shall be paid from the state treasury.

Sec. 9. The board shall make a report in print to the general assembly, annually, of its proceedings during the year ending on the thirty-first day of December next preceding, with such suggestions in relation to the sanitary laws and interests of the state as they shall deem important.

SYNOPSIS OF THE LAW OF MARRIAGE IN RHODE ISLAND.

TITLE XX, CHAPTER 163 PUBLIC STATUTES.

Sections 1, 2 and 3 show what kindred persons cannot marry, and declare marriages within prohibited degrees, null and void.

Section 4 makes an exception in favor of Jews, within the degrees of affinity or consanguinity allowed by their religion.

Section 5 declares the marriage of persons having a husband or wife living, and of idiots or of lunatics, absolutely void.

Sec. 6. "Any ordained minister or elder of any religious denomination, who shall be *domiciled* in this state, and either justice of the supreme court, may join persons in marriage in any town of the state." (It will be seen that clergymen from other states *cannot solemnize marriages* in Rhode Island. Marriages solemnized in Rhode Island, by clergymen living out of the state, are null and void.)

SECTION 7 defines what shall be understood by the term "religious denomination," within the meaning of the preceding section.

SEC. 8. Wardens in the town of New Shoreham, may join persons in marriage in said town.

SECTION 9 provides that no minister, elder, magistrate or warden shall join persons in marriage, unless such persons, if residents of this state, shall first present a certificate properly executed and signed by the town or city clerk or city registrar of the town or city in which such persons shall reside, and if not residents of this state, then from the town or city clerk or registrar of the town or city in which the marriage shall be solemnized, to the effect that the said town or city clerk or registrar has *duly recorded* the *intention* of marriage between the parties named in the certificate, and no town or city clerk or city registrar shall issue such certificate to any minor or person under guardianship, unless the consent in writing of the parent or guardian shall have been first obtained.

SECTION 10 provides that every society of Friends, and every person authorized to join persons in marriage shall certify upon the certificate required in section nine of this chapter, the time when and the place where the marriage shall have been solemnized by him, and shall on or before the second Monday of every month return the certificate of every marriage solemnized by him during the last preceding month, to the clerk or registrar of the town or city in which such rite shall have been performed.

SECTION 11 forbids the solemnization of the marriage ceremony, by any person, when lawful objection is made thereto in writing, until such lawful objection be removed.

SECTIONS 12, 13 and 14 provide that any person who shall join persons in marriage contrary to, or in violation of, chapter 163 of the Public Statutes, shall be imprisoned not exceeding six months, or fined not exceeding one thousand dollars.

SEC. 15. The solemnization of marriage shall be in the presence of two witnesses at least, besides the minister, elder or magistrate officiating.

SECTION 16 relates to marriages among Quakers or Friends, and among Jews, making them valid if in accordance with the forms, rites and ceremonies of the same respectively.

SECTION 17 provides that any persons joined in marriage in this state, who have neglected to comply with the law as set forth in the preceding sections, shall be imprisoned not exceeding six months, or fined not exceeding one thousand dollars.

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